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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CLXVIII. No. 3203.] LONDON, OCTOBER 1, 1924. [76TH YEAR. PRICE 1s.

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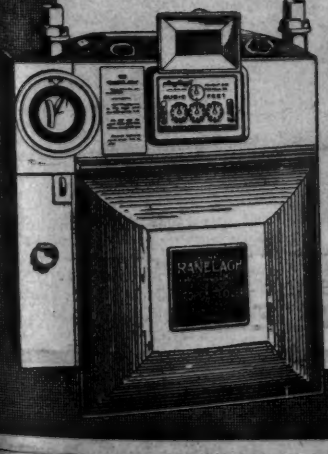

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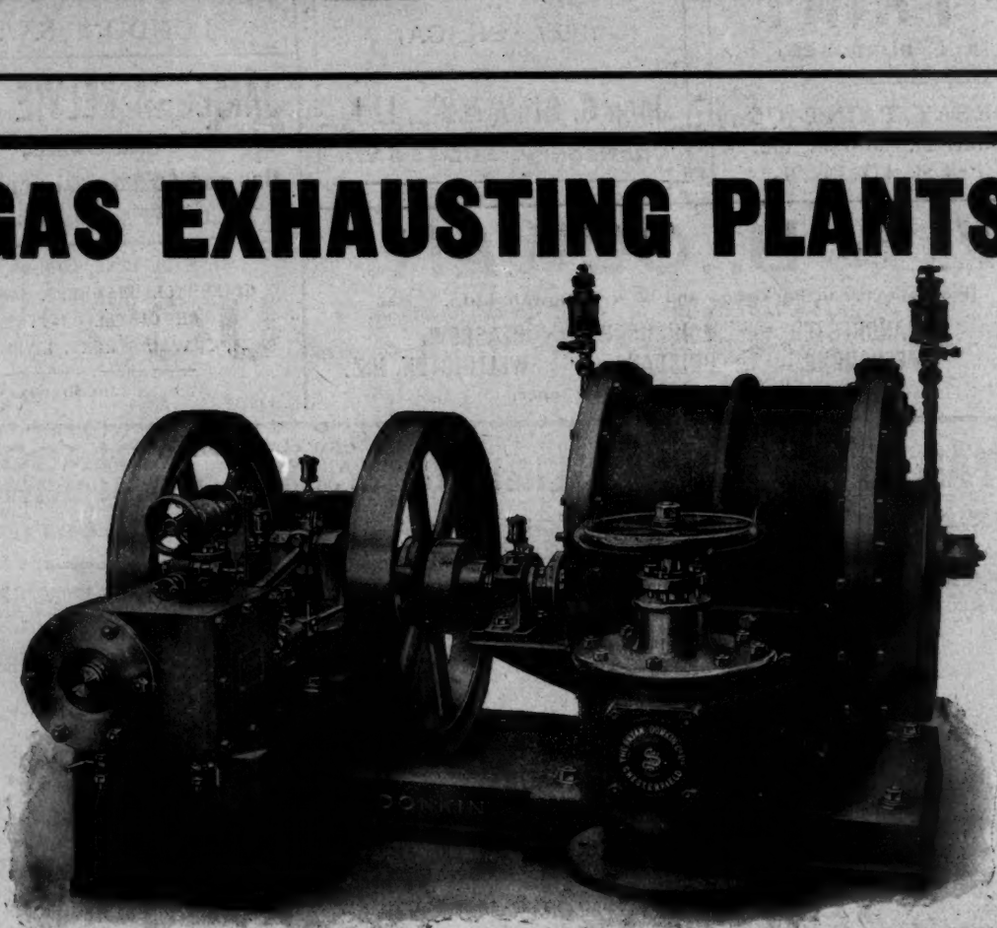

Fig. 792.

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VOL. CLXVIII., No. 3203.] WEDNESDAY, OCTOBER 1, 1924. [76TH YEAR.

EDITORIAL NOTES.

The "B.C.G.A." and Changed Circumstances.

OFTEN have we heard of the good old times, and how things went along very well then. There are less distant times within the memories of those of us actively engaged in the work of the gas industry in which things were done very differently from what they are to-day. But then the conditions and environment of the gas business were of a different order. There was a time when there was no "B.C.G.A.;" and then gas undertakings worked within their own areas as though they constituted the limits of all influences having a bearing upon the interests of the gas business, or of the industry. That was all very well at one time; but we know to-day it would have been vastly better for the industry had those conditions not continued to prevail so long. Almost imperceptibly the changes came; there was one change that gave the gas industry a nasty shock in the early eighties. It was the incandescent mantle —the invention of a scientific man not associated with the gas industry—which saved it then. But competition grew and grew; and other changes came. Every development the industry made was assailed from one or more quarters. In large sections of the industry, things continued in much the same manner. But nearly fourteen years ago, there came what had been wanted for years—the birth of the "B.C.G.A."—and this due to the energy mainly of Mr. F. W. Goodenough (subsequently and now the Executive Chairman of the organization), who had previously read a paper on the subject before the Institution of Gas Engineers. It was a fine conception. It was so because it was a need, and an increasing one, in an industry which had pursued its course largely by traditional methods, and those methods had not to any great extent altered, though surrounding and confronting circumstances had done so in a remarkable manner.

These reflections arise out of the interesting and philosophic address which the President of the Association, the Chairman of the Liverpool Gas Company (Mr. H. Wade Deacon, C.B.E., J.P.), delivered yesterday at the thirteenth annual meeting of the Association, which is being held in that city. As the President reminds us, when the organization started, the membership numbered 250, representing 56 p.ct. of the total output of the gas undertakings of the country. In view of what we have said in the foregoing paragraph, that was a wonderful beginning. It was not the result of a single circumstance. It was partly due to the individual recognition that the old ways alone were not sufficient, and that they should be supplemented by co-operation and the influence and power that come from unity, and which is largely non-existent among floating particles; and further due to the missionary work which had been carried on by the protagonist (and others) of organized effort, and which had awakened new ideas and had been persuasive of the necessity of activity of an order that had not hitherto obtained. If the strength shown by the Association at birth was remarkable, then what can be said of its strength at the present time, when membership has more than trebled in number, and representation is only short by 8 p.ct. of the total output of town gas in this country? This testifies to several things. In the first place, it shows how the views held by the administrators of 250 undertakings in the beginning of the organization have spread to those of 523 more. It was probably not so much the example of the 250 as the principles and objects, the proved influence, and the fact that co-operative effort could effectively penetrate where individual endeavour could not, and that co-operation could do things which individuality could not, which influenced and successfully urged acceptance. The representative character of the organization to-day is an extraordinary success; and it would ill-become those responsible for the unrepresented 8 p.ct. of gas output to say that the numerous administrators in charge of the 92 p.ct. have made the greatest mistake of their business lives in becoming associated with the organization. That would be foolish to the point of being humorous.

Moreover, results prove, and very insistently, that the Association have done distinguished work—work which cannot be assessed, but nevertheless valuable work. It has sown seed here, there, and everywhere—in the highways and by-ways of influence. Perhaps not the least of the good work that it has accomplished has been, through co-operation and collaboration of gas undertakings, to inspire and stimulate local work and service. There has been no obtrusive endeavour in this direction; but it is a direct outcome of the enthusiasm and work at the headquarters of the organization—of both the Executive Committee and the staff. As the President said: "There never has been, and I am "sure there never will be, the slightest desire or attempt on "the part of the Association to interfere with the absolute "control which each undertaking has over its own affairs." But we are all prepared to admit that the teachings and lessons that have issued from the work and conferences of the Association have had a beneficial developing influence on the ideas, activities, and methods of the personnel of gas undertakings; and in the administrative zone there is a livelier interest, and help on a more generous scale, in the public service and sales department. We have been observers of this growth—a growth much accentuated during the life of the Association. For all these and other reasons within our knowledge, we heartily endorse the President's words: "Without exaggeration, I may say that the work done by "the 'B.C.G.A.' has proved the great value of regular and "habitual co-operation between gas undertakings, and be-"tween individual officers too, and that without such work, "and work done by the National Gas Council, and the Insti-"tution of Gas Engineers, the gas industry would not be in "the favourable position it is in to-day." And, further, it is a result of which those who are responsible for the administration of the Association may well be proud; for it has not been achieved by accident or luck, but has been reached by hard work and the scientific use of imagination and courage.

There is no question that the President has taken a very proper measure of the importance of the gas-trading work of the industry. We shall never be content until in every gas undertaking it is recognized that the selling and proper utilization of gas is fundamental to the whole of its operations, and is given equality with the manufacturing side. Far be it that any reader should think we desire to belittle the latter. We would not take from it a single shred of its important status; but the work of the selling end is equally as essential to the manufacturing end as the work of the latter is to the former. They are co-partners in the promotion of the utmost success, and as such there should be equality in consideration, encouragement, and in providing the requisite for efficient operation. That is the way of true and maximum progress. We see the appreciation of this in the address—particularly in the

wise remarks of the President on advertising and the Gas Exhibit at Wembley. In all this there is warning against looking for immediate substantial results. The seed must germinate, and the plant grow; but it is all an assurance for the future expansion of the business of the industry. The advertising of a time ago is still bearing fruit; advertising to-day will yield results in the days to come. What the gas industry is doing is something which all citizens should help to foster—to their own advantage and to the preservation of their fine buildings from the blackening by smoke and the erosive influences of the acids from crude coal burning. The President points to St. George's Hall, the Art Gallery, the Town Hall, and the Dock Offices as architectural attractions of Liverpool. They are also monuments to the evil work of the products of the combustion of raw coal. The address is one from which not only the gas industry but the community generally may profit, and the citizens of Liverpool in particular.

A Question of Public Policy for the Board of Trade.

The Board of Trade are confronted with a problem—as to the best course to take in relation to a very simple question, but which may, through the decision arrived at, have an important influence upon the future of gas supply by public bodies. It arises from the Skegness Special Gas Order; and though Skegness is not a large place, it affords a very apt illustration of the vicious effect that a debarring piece of legislation may have upon the fortunes and good conduct of a public utility undertaking. In this case, particularly as it may form a precedent, we plead for consideration being given to the question from the important point of view of public policy, and not from that of the effect upon a part—and a small part to them individually—of the interests of a limited section of the local tradesmen. We believe heartily in private enterprise being defended to the utmost reasonable extent, but not when such defence will be detrimental to the interests of the ratepayers generally, and will deprive them of beneficial facilities and protection. We remember how, years ago, eminent Counsel used to argue in the Parliamentary Committee Rooms for changes in gas legislation on the ground of public policy; but in this instance it is not a change that has no precedent. There is plenty; but the Skegness undertaking, belonging to the local governing body, have been denied what many other concerns possess. To that extent the undertaking is debilitated in serving the public.

The report of the proceedings at the inquiry into the Skegness application, held by the Director of Gas Administration (Mr. H. C. Honey), and published in last week's "Journal," relates explicitly what it is the District Council desire, and what the local tradesmen ask should not be allowed. But there was not a single point in the evidence of the latter which showed they would be substantially injured by what the Council wish for, while there was material evidence (particularly in that of Mr. Fred Young, the Gas Engineer and Manager) which proves that the concern is considerably handicapped in its public service through being bound hand and foot in the very lines of business upon which, in a resort such as Skegness (where electric lighting is certain to have large sway), the gas undertaking must rely. Anything which holds it back from rendering the largest and best service, and prevents its developing to the maximum is not—we say this deliberately—in the interests of the public at large. The public interests should have as much consideration as those of a section of the local traders, who will still be able to do all similar business of which they can by their enterprise become possessed. In the Council's Act of 1915, there was the usual fittings clause, the second part of which provided that the Council "shall not themselves lay any pipes on the consumer's premises, except between the main of the Council and the consumer's meter, nor shall they sell any gas-fittings as aforesaid except through a contractor"—that is to say, "engines, stoves, ranges, pipes, and other gas-fittings." The Council are now seeking the deletion of those words, and, further, are desirous of being empowered to specify the pipes and fittings to be provided on premises by owners or occupiers. These are rational proposals in the interests of the undertaking, and of those of the general public. It is believed by the Council that the urban district is on the road to a large development, and that the local gas undertaking should be placed in a position to take the largest possible share in rendering facilities in that development in the best of ways. This they cannot do in present circumstances; and no private trader can do in this respect what the Council could do through making proper provision for the use of such a convenient labour-saving, smoke-preventing fuel as gas. Public policy urges that this should be done; and Skegness in these days of growth and vitality should be granted every legitimate opportunity in this direction. The local tradesmen have no objection to the specification by the Council of the size of piping in houses. That power is very essential when builders do not trouble about adequacy, so long as something which they can call piping is there, while the gas undertaking has a direct interest in seeing that piping is provided and placed so as to be of the maximum value for any purpose to which the tenant may wish to apply gas. Next to adequacy of piping comes efficiency in appliances and gas fittings. To have efficient and safe appliances and fittings is a matter of supreme importance to the public; but without any disrespect to the Skegness traders in these things we hazard the opinion that they have not the knowledge requisite to give the public the most efficient gas appliances—structurally or thermally. Then there comes the question of purchase facilities. The Council are debarred from selling appliances. They cannot sell on the easy terms essential to the prevention of cheaper, inefficient, and poor-grade appliances being put into houses. Purchase by periodical payments is an excellent method of spreading the conveniences of gas supply. Some people will not hire, because of the permanent charge involved; but they will hire-purchase. In many ways it is better for the gas undertaking that they should provide this facility. Moreover, development in the use of gas appliances by whatever means is good for the public from the point of view of the increase in the gas business, which, of course, tends to lower costs and so cheapen the commodity.

From the point of view of public policy, the case is distinctly in favour of the Council's petition for revised and extended powers, and the arguments are not exhausted. The Board of Trade know that there has been much advocacy of inspection of consumers' fittings on the ground of safety. It was raised at a conference at the Board of Trade. One of the greatest dangers in connection with the use of gas is the ability of the public to purchase inferior fittings anywhere, and have them fitted in incompetent manner. The powers the Skegness Council are seeking will, if allowed, assist in promoting the use of efficient and well-constructed gas appliances, and thus safety. Mr. Butterfield in his recent report has advised the formulation of a general system of inspection. That in our opinion is good so far as it goes; but to ensure the initial adoption of sound appliances, in all cases, will be a great step towards the achievement of the desired results. Then these are days of labour-saving. Nothing need be said on that point. There has been great advocacy of smoke prevention as a social reform, for the promotion of health, the protection of life and property, and the reduction of labour through the cleansing of the atmosphere of the effluvia from chimneys. A Bill is in Parliament, which, in its amended form, proposes to give power to local authorities to make by-laws to prevent the emission of smoke, or reduce it, in connection (*inter alia*) with domestic heating and cooking. All this points to the need, in the improvement of the conditions of life, of the means of doing this being placed in the hands most competent for the purpose, possessing the best resources for achieving the desired end, and having the best of incentives for such developing work. Times have changed, new knowledge has come to us; and we have to legislate for progress, and not for maintaining a condition of things which we know has been detrimental, and will continue to be so, if not altered. In considering this matter, and giving a decision, we are confident that the Board of Trade will make examination from all points of view.

Miners' Federation Consternation and Wild Schemes.

Consternation is growing among the miners as to the operation of reparations coal under the Dawes report; and members of the Government have become a bit more than uneasy over it. Mr. Frank Hodges, late Secretary of the Miners' Federation, and now a member of the Government, has spoken with no uncertain voice regarding the subject. Briefly, he feels that the scheme will add a new evil to those the mining industry already has to bear. The Prime Minister, too, is not at all comfortable over the position, as it is clear that reparations coal must accentuate the financially

gloomy position in which the industry is at the present time —particularly in respect of the export trade, and the further depression that has come over those industries in this country (such as the iron and steel) through competition with makers abroad, who are producing under more favourable conditions in regard to the costs of both fuel and labour. Price is taking an important part in the muddled situation in which the coal industry finds itself. There has this year been a considerable falling-off in exports; but last month saw a revival, though only through a reduction of the f.o.b. cost of coal. This shows that people will buy from us, though only at a price. The "Iron and Coal Trades Review" gives the average price of coal exported in April as 24s. 11d. per ton. In that month, the quantity shipped was 5,062,941 tons. The demand had a downward slide, until the price was reduced; and then last month saw approximately the same quantity of coal leaving our ports as in April—5,074,744 tons—but at an average reduction in price of 2s. 4d. per ton (22s. 7d. against 24s. 11d.) in April. That 22s. 7d. does not represent the average value of gas coal in August, which was down to 21s. 10·9d. per ton. One result of this is that various British mines have closed down, or are about to do so, because it does not pay to work them; and so the total of unemployed miners has been increased, and is increasing. No wonder there is consternation among the miners' leaders, and the miners themselves. They manifestly see worse conditions ahead with Germany re-commencing her normal activities in the Ruhr area, and vigorously re-entering the export trade—in fact, she is now a competitor with whom the British coal industry has seriously to reckon.

The facts of the position show that it is altogether a matter of economics. The economic conditions of the British mining industry are wholly opposed to the maintenance of a reasonably paying position in the overseas markets, and the conditions in that industry are adversely influencing the circumstances of other home industries which are large buyers of coal. We cannot believe that the leaders of the Miners' Federation do not realize this—in truth, we are sure they do, as they are beginning to cast round to see how they can hold their own insecurely constructed fort by trying to meddle with international economic conditions in order to make them suit their own policy, and so defend their own situation. They never will be able to do that; but they are apparently going to make an effort. Germany, however, is not likely to brook dictation by the British Miners' Federation as to the lines along which they are to work when they see the opportunity, by the means already in operation, of re-capturing their outside coal trade. The Miners' Federation say they are resolute against the miners departing from the seven-hour day, nor do they intend to renounce any other of the conditions they have won during the last decade. Yet the improvement of the miners' conditions—and of the conditions of the workers in other industries—in regard to employment are irrefutably bound up with production at lower costs. In the case of our mines, the men are only working (those who have work) from 38½ to 44 hours a week, while the German miner is working from 54 to 60 hours a week, and at lower wages. How can we hope to compete with that condition of things? No one wants our miners to be in receipt of lower wages per week; but everybody wants coal to be produced at a cost per ton which will enable the country to hold its own against others. The Miners' Federation desire to talk to the Prime Minister about these matters. They do not, however, wish to contribute anything to the improvement of the economic conditions at home; but they want to alter the basis of international economic conditions by dictating to Germany how much the miners in that country should receive and how many hours they should work. If by some means they could bring about the same economic conditions in the coal business in Germany as rule at present in this country, then all would be well—at least so they think. In their view, reparations coal is going further to enslave the German miners, and thus there is the prospect of the "standard" of British miners (whatever that may mean) being driven down to the standard of those in Germany. This, it is stoutly said, the British miners cannot, and will not, countenance. How are they going to prevent it? They have not been able hitherto to obviate conditions going from bad to worse in the British coal industry; and this has been contributed to by the policy of the Federation. [It is stated that the new Ruhr Coal Syndicate, which met for the first time last Friday, have decided to reduce the price of all grades of coal by 10 p.ct., as from to-day.] The danger signal is showing vividly. If they are going to adhere to their policy, then the miners have not yet seen the bottom of the hill. The love of country may be far greater among the miners of Germany than their love for the British miner; and as things are in that country and as they are here, the prospect of idle miners in Germany is diminutive compared with the prospect in this country. It is no use declining to look hard facts straight in the face. The Miners' Federation are looking at them, but are trying to escape from their inevitable influence and consequences, and do not find this an easy matter. We realize their uncomfortable position, but it is impossible to go farther with them. It would be more to the point if the Miners' Federation and the Mining Association would get together, and see whether they can mutually do anything to bring better conditions to the industry. It would be far better than the quixotic idea of trying to remodel the economic conditions of the world by means and ends that are obviously unattainable.

While on this subject, it may be mentioned that publication has been given to a number of the resolutions that are to be brought forward at the annual conference of the Labour Party, to be held on Oct. 7 and the three following days. Among other things, it is observed that the Government are to be pressed as to the importance of bringing before Parliament, at the earliest possible date, a carefully considered and complete measure for the nationalization of the mining, coke, and bye-product industries, including the production of bulk electric power, the ensuring of an adequate minimum wage for all workers therein, with the necessary and proper safeguards of the national finances. The electrical scheme is to be based on public ownership and control; and in the meantime no Private Electricity Bill is to receive Government sanction or support. The electricity industry will no doubt be delighted over this, and may have something rather pertinent to say to the Government regarding it—if the Government are foolish enough to attempt to act upon the resolution (if passed) of the Labour Party. The coal, coke, bye-product, and electricity scheme is a bold conception, which is only equalled by another, proposing that the Government should enter into agreements with the Dominion Governments for the bulk purchase of foodstuffs, arrange for their transport, and eventually their distribution by municipalities and other local authorities and consumers' co-operative societies, with the enforcement of uniform standard prices. We will not comment on these suggestions; it is not worth while.

Wembley.

It is officially announced that the closing date of the British Empire Exhibition will be Nov. 1. There is still great hope of obtaining the support of the Dominions to continue the exhibition next year.

Directors and Contracts.

It is stated that a member of the Northampton Town Council —Mr. James Gribble—has served notices on six members who are Directors of companies holding contracts with the Council, informing them that he intends to issue writs against them for taking part in a meeting of the Council on Sept. 1. No explanation is given in the report to hand as to why Mr. Gribble has been moved to this kindly act!

Practical Celebrations.

The British Gas Light Company, Ltd., have held their hundredth annual meeting, with the Chairman (Mr. Henry Woodall) presiding. The constitution of the Company is unique; and there are thus some things which they cannot do so well as can other companies who have only one seat of operations and one set of Acts or Orders to which they have to work. They cannot, for example, adopt co-partnership because of their constitution, and co-partnership cannot be made to fit a maximum price company so well as a sliding-scale one. But there are practical men in charge of the affairs of the Company. They considered how they could best commemorate the centenary of the Company. In the result, they entertained the whole of the employees, with their wives, at Wembley; and they did this by three excursions from the various stations—the Company providing railway fares, free

admission to the exhibition, two good meals, and each employee had a little money present. These excursions required some organizing; but they went through well, and gave immense pleasure to the workers and their wives. But for the employees the Company have also done something of a more permanent nature. They have formed a pension fund to come into operation next year, and this will be on a generous scale, so as to compensate to some extent for the absence of co-partnership. With a good pension fund available, some of the men may strive to celebrate centenaries of their own.

Coal Exports.

During August, the quantity of coal exported was 5,074,744 tons, of a value of £5,732,629. In August, 1923 and 1922, the quantities were respectively 6,580,410 tons and 6,146,121 tons, and the values £8,314,710 and £6,873,551. The amount of gas coal sent abroad last month was 730,056 tons, compared with 766,935 tons in August, 1923, and 882,531 tons in August, 1922. The values were respectively £799,728 (averaging £1 1s. 10·9d. per ton), £939,662, and £944,636. Taking the eight months of the year, the total coal of all sorts sent abroad was 41,693,690 tons; in the corresponding periods of 1923 and 1922, the figures were 53,156,546 tons and 38,393,844 tons. The drop between last year and the present one is accentuated by the values, which were: 1924, £50,099,242; and 1923, £67,571,441. Up to the end of August this year, 5,727,586 tons of gas coal were exported, which compares with 6,211,911 tons for the corresponding period of last year, and 5,457,208 tons for 1922. The values were: 1924, £6,703,293; 1923, £7,568,458; 1922, £5,983,436.

Gas Coke Shipments.

Comparatively, gas coke did not do at all badly during August; but in the eight months of the year it has dropped heavily in tonnage, but not in values, and this may be put down in part to the continued high price of anthracite. During August the quantity of gas coke sold abroad was 105,714 tons, which compares with 104,482 tons in August 1923, and 92,171 tons in August, 1922. The values were: August, 1924, £186,307 (an average of £1 15s. 2·9d. per ton); 1923, £172,640; and 1922, £125,007. In the eight months of this year, 613,533 tons of gas coke were sent overseas; the figures for the corresponding period of 1923 and 1922 being respectively 694,056 tons and 474,212 tons. The values were: 1924, £1,073,766; 1923, £1,077,165; 1922, £688,164.

Sulphate of Ammonia Exports.

Business in sulphate of ammonia this year shows a quantitative improvement on 1923. The amount sent abroad during the month was 23,196 tons, as compared with 17,002 tons in 1923. For the eight months the amount exported was 177,792 tons, as compared with 161,148 tons in the same period of last year. In August, Spain, the Canaries and France, were our best customers.

Tar Products.

Among the tar products, we see that in August the amount of benzole exported was 76,606 gallons, compared with 366,562 gallons in August, 1923. In the eight months, 1,169,866 gallons were sent abroad, compared with 998,939 gallons in the corresponding period of 1923. Of naphtha the August shipment was 1780 gallons, against 8840 gallons in August, 1923. In the eight months 151,290 gallons were sent abroad, which contrasts with 83,844 gallons in the same period of 1923. Of tar oil, creosote, &c., 5,233,363 gallons were exported in August, as compared with 2,627,301 gallons in August, 1923. This spurt, however, did not lift the exports above those for the eight months of 1923, in which period 30,860,855 gallons were exported, as compared with 29,258,003 gallons in the past eight months.

A large assemblage of relatives and friends witnessed, on the 24th ult., in the Parish Church at High Wycombe, the marriage of Miss Mildred May Baker and Mr. Terence John Wiley. The bride is the only daughter of Mr. Harold Baker, who was for many years Engineer and Secretary of the High Wycombe Gas Company (now amalgamated with the Uxbridge Gas Company), and is a highly popular townsman. The bridegroom is a practising solicitor at Brighton. About 150 guests attended the subsequent reception in the Town Hall.

PERSONAL.

On Friday last the members of the Richmond Gas-Works Athletic and Social Club assembled in the club room to bid farewell to their President, Mr. E. George Hutchinson, who is this week terminating his service with the Brentford Gas Company. Mr. J. Calrow, the Chairman of the Club, in a short speech expressed on behalf of the members their great appreciation of the many services rendered by Mr. Hutchinson to the Club. It was principally due to the great assistance received from Mr. Hutchinson during his tenure of office that the Club had been so successful, and it was the wish of the members that he should accept a small farewell gift. Mr. F. Green (Vice-President), presenting the gift, which took the form of a smoker's cabinet, endorsed the remarks of Mr. Calrow, and expressed the hope that Mr. Hutchinson would never forget the happy hours he had spent with the Club, which had been of such assistance in joining all classes on the works together. Mr. Hutchinson, in reply, expressed his regret at being unable to thank the members adequately. The pleasant days at Richmond would be a lasting remembrance, and he hoped to hear of the continued success of the Club.

Alderman J. H. Waddington, the well-known Chairman of the Halifax Gas Committee, is to be the next Mayor of Halifax. Alderman Waddington, who is a native of Halifax, entered the Town Council in 1903, and has been a member ever since, except for a brief period in 1906. For many years he has been Chairman of the Gas Committee, and has brought himself into close touch with the industry. He is a Past-President of the Halifax Chamber of Trade and of the Drapers' and Hosiers' Association, a foundation member of the Halifax Rotary Club, and a Freemason of twenty years' standing.

Mr. J. G. Van Niftrik, having expressed the desire to retire, on account of advancing years, from the post of Manager of the Imperial Continental Gas Association's gas-works at Flushing, which he has held for the last 35 years, the Board last week accepted his resignation with regret. To fill the vacancy thus created, the Directors appointed Mr. J. J. Van der Jagt, Assistant Engineer, who has been in the Association's service at Flushing since 1908.

Dr. J. S. Haldane has succeeded Sir John Cadman as President of the Institution of Mining Engineers.

Mr. Edwards, Manager of the Westport Gas-Works, has been appointed Manager of the Roscommon Gas-Works.

The Minister of Health has appointed Mr. James Picken, B.Sc., A.I.C., to be an Inspector under the Alkali, &c., Works Regulation Act, in place of the late Mr. H. Bailey.

Mr. L. J. Warren, late Representative of Messrs. A. J. Sutherland & Co., General Manager of George Wilson Gas-Meters, Ltd., and formerly of Messrs. Willey & Co., Ltd., gas engineers, Exeter, has become a Director of the Middlesex Gas-Meters, Ltd., of Trinity Works, Montague Road, Hounslow, and Manchester.

The Secretary for Mines announces that he has appointed Mr. F. N. Siddall, His Majesty's Junior Inspector of Mines, to be a member of the Committee on Mechanical Appliances, in place of Mr. C. D. Mottram, who has retired. He has also been appointed Secretary to the Committee set up to inquire into the methods now adopted to prevent danger in mines from accumulation of water or other liquid matter. Mr. A. D. Stedman, M.B.E., of the Mines Department, has been appointed to act as Secretary to the Committee.

OBITUARY.

The death has taken place after a long illness of Mr. Andrew Terrace, of Gowanlea, Blairgowrie. Deceased, who was in his 70th year, was for a long period Manager of Blairgowrie Gas-Works, a position from which he retired in 1917.

The death is announced, at Stratford-on-Avon, of Mr. F. L. Thompson, aged 71, formerly clerk to the guardians at Solihull. He was associated with the Solihull Gas Company for half-a-century, and for many years served the Stratford-on-Avon Town Council as Auditor to the Gas Department.

Alderman William Court, J.P., one of the best-known figures in Labour politics in Halifax, who died on Sept. 23 at the age of 75, began life in the Halifax Gas-Works in the fifties and worked there thirty years, when he left to take charge of the gas plant for Frederick Smith & Co., Caledonia Wire Works, Halifax. He was a member of the Town Council from 1908, being made alderman two years ago, when he was elected Chairman of the Markets and Parks Committees. He was created a magistrate in 1910. He has been Director of the Halifax Industrial Society, and held various offices in the Halifax Trades Council. He was formerly President of the Halifax Coal Society.

Wales and Monmouthshire Junior Gas Association.—The opening meeting of the new session will be held at Cardiff next Saturday afternoon (Oct. 4). Members will meet at the Grangetown Gas-Works at 3 o'clock for a visit of inspection, after which they will proceed to the Gas Offices, Bute Terrace, where tea will be provided by the Cardiff Gas Light and Coke Company. The new President (Mr. B. J. Bell) will then give an address.

ELECTRICITY SUPPLY MEMORANDA.

Following closely upon the annual account of the work of the Ministry of Transport, we have the report of the Electricity Commissioners for the year ended March 31 last. It is an interesting document—showing progress in economical production, fuel efficiency, and expansion in trading. The number of authorized undertakings dealt with is 560; 335 of these being local authorities, and 225 companies—a net addition of sixteen to the number of authorized undertakings. A point worthy of notice is that it may be taken that supplies are available in districts in which are to be found, in the aggregate, 74 p.ct. of the total population of the country. But availability and actual use are far from harmonizing. The fact is there is availability in the best of the electricity consuming areas of the country. Therefore, those who are proposing to spread the availability by expensive means had better pause and consider the question more deeply than they have done hitherto, as well as the probable effect of their intentions upon the remainder of the electricity supply industry. New business is sometimes only to be obtained at a cost which will make its possession unlucrative. When this is so, it lowers the financial position of the business. Consider these figures. The density of population in the local government areas included in the districts of supply of authorized undertakings in England and Wales aggregates nearly 38 millions. Nearly 80 p.ct. is concentrated in 11 p.ct. of the total area, with an average density of 4615 per square mile! The remainder of the country has an average density of population of only 151. Those who ponder over this last-named figure will see that the problem of supplying rural or sparsely populated districts is not likely to be solved most economically by expensive transmission lines, along which the farther the current is carried, the greater the losses incurred. It therefore appears that the most profitable course for existing undertakings is to extend their systems as areas offer the prospect of profitable business, and meanwhile concentrate upon development of trading where cables already exist. But the point should be made that the existing availability of supply is unevenly distributed, although about 74 p.ct. of the population are in close touch with distribution systems. There are, it is stated, some fifty municipal borough and urban districts, with populations of 10,000 and over, in which general suppliers have not yet been authorized. Perhaps these can be best dealt with by combining electricity service with the gas supply. The Electricity Commissioners may have something to say upon this line of development in subsequent reports.

Supply Development Problems.

As to the sales of electrical energy, the increase over the preceding year was 19 p.ct.; and the total consumption was about 100 kw.-h. per head of the population in Great Britain. Put into complete figures, the sales were 4,338,850,926 kw.-h., compared with 3,645,190,732 kw.-h. If the tramway and traction stations and the non-statutory undertakings were included, the consumption would probably be of the order of 200 kw.-h. per head of the population. In this connection we fancy the "Electrical Review" is disappointed with the supply companies. It makes the remark that the grant of an effective monopoly of the supply of a commodity such as electricity carries with it a responsibility not only towards the shareholders, but also to the public; but it does not seem to think this has penetrated the understanding of some of the companies engaged in electricity supply. It tries to stimulate the companies by telling them of a menace. Unless they take a broad view of their moral obligations, they may find themselves controlled either by the Commissioners or by the Joint Electricity Authorities, after the fashion of the Public Service Commissions in the United States. A much better plan, in our opinion, would be to place them all on a sliding-scale basis in respect of prices and dividends—that is, prices to the lighting consumers, and not including power, heating, and cooking to obtain a low average; the latter being merely due to competitive expediency, owing to electricity being thermally more expensive for cooking and heating than the fuel used for raising the steam for the generation of the current. A sliding-scale of price and dividend based on the ordinary lighting prices would do something, in the case of company supply, to relieve the packhorses—the lighting consumers—of the electricity supply industry. However, reverting to the 19 p.ct. increase in consumption, the electricity industry congratulates itself upon it. The point is whether it may be regarded as normal increase, or in large part due to the slow revival in industry.

Sales Development.

Fuel returns were supplied to the Commissioners by 541 generating stations, and 450 of these were classified on the basis of thermal efficiency. The amount of electrical energy generated by the supply undertakings was 5,396,861,000 kw.-h.; and by the railway companies, tramway authorities, and non-statutory undertakings, 6,681,524,272 kw.-h. The amount of coal and coke consumed by the former class was 6,237,608 tons, and by the latter class 7,527,306 tons, which figures represent about 94 p.ct. of the total fuel consumed in the generation of electricity; we presume, gas, oil, and water power made up the balance. The returns show an increase of 16·4 p.ct. in the number of units generated, and an increase in the consumption of coal and coke of about 11·2 p.ct. The difference shows there has been an improvement in working efficiency. There are three stations (Group A) generating over 200 million kw.-h. per annum. Of these the station with the lowest fuel consumption is the Carville "B" station of the Newcastle-on-Tyne Supply Company, with a consumption of 1·96 lbs. per kw.-h.; while the stations in the same group with the highest thermal efficiency are those of the Glasgow Corporation—17·47 p.ct. But this is beaten by the Barton power station of the Manchester Corporation, in Group C—stations generating between 50 and 100 million kw.-h. This is one of the stations where gas coke is used with the coal. The average fuel consumption at Barton is 1·48 lbs., and the efficiency 20·33 p.ct. The North Tees station of the Newcastle-on-Tyne Company in Group B—stations generating between 100 and 200 million kw.-h. a year—is also better than the best stations in Group A; the fuel consumption being 1·67 lbs. per kw.-h., and the thermal efficiency 17·6 p.ct. There is eloquent support in the data for the views of those who do not see much to be gained by going to stations of mammoth size. There are no other stations with a lower fuel consumption than 2 lbs. per kw.-h., or a higher thermal efficiency than 16 p.ct. In the groups with lower outputs than those mentioned, the consumption of fuel per kw.-h. goes up to extraordinary heights—for example, the best consumption in Group L stations—generating between 50,000 and 100,000 kw.-h. per annum—is 11 lbs. per kw.-h. This presents a case for the elimination of the small and uneconomical stations, either by supply from large ones, or by co-ordinating the utilization of fuel by the combination of gas and electricity supplies, or otherwise. But, of course, where supply is from large distant stations, there must be a set-off on account of transmission costs and losses.

Fuel Data and Efficiency.

An interesting part of the report deals with the work of the Commissioners in endeavouring to effect the re-organization contemplated by the Act of 1919—that was, by the centralization of generation by the transfer of appropriate generating stations to Joint Electricity Authorities. But what was contemplated has been confronted by unsuspected difficulties—particularly in respect of the ardent desire of the majority of authorized undertakers to retain the ownership of their generating stations, and to develop independently. The Commissioners also comment on the lack of boldness in conception in the engineering schemes which have in this connection been submitted to them. In some areas Advisory Bodies have been set up, instead of Joint Authorities. With these the most that can be essayed is to provide for a co-operative scheme of control for the working of interconnected stations forming the principal sources of supply in the district. Therefore the effectiveness of such bodies must depend upon how far the constituent authorities can be influenced to place the general interest of the district in the forefront; to refrain from proceeding with individual developments which may appear to be of local advantage, although militating against the ultimate interests of the approved technical scheme for the district; and to participate in an adequate scheme of control of the interconnected stations of the individual undertakers. The Commissioners consider that the control of the working of stations remaining in individual ownership offers far less prospect of economies than central ownership, and is less likely to succeed in bringing about an adequate improvement in the organization for the supply of electricity in any district. The report is a voluminous one; and the data are of an extensive order. But here we have briefly reviewed the salient features.

Re organization.

The inquiry which a Special Tribunal has been making into the wages dispute in the electricity industry, due to the application for an increase of 10s. per week, has been remarkably interesting. The views of the two parties as to the position of the industry and its capacity for meeting the increased wages demand, are as wide asunder as the poles. On the employers' side, there was an almost ruthless depreciation of the industry, while on the other side there was wordy contradiction, unsupported by data of any description, of all the employers advanced. Areas of supply differ so much in character that some undertakings could not possibly bear the burden of an increase of wages; and in all districts competition is such that the addition which would have to be carried by the consumers would affect the progress of business—especially in the low-priced units. Then, again, in industrial areas factory and millowners can supply themselves cheaper than the local undertakings, but that they do not do so in all cases is because they can more profitably utilize in another direction the capital that would be involved. Spinning mills were cited as an example. It was mentioned that the Doncaster Corporation had been out-priced in respect of a railway contract by neighbouring collieries with surplus energy to sell. It was felt by the representatives of the employers that the trade unions concerned had a lot to learn as to the ability of the industry to pay more wages. The men's representatives contended that there was no need to inflict the increase of wages upon the consumers. There were the surplus profits which were disposed of in other ways at present which could be used to meet the demands of the men. We cannot see very well how this can happen until those glorious days come when electricity supply will be nationalized and the profits—if there are any then—are pooled, inasmuch as there are electricity undertakings which do not make net profits, but actu-

The Wages Inquiry.

ally show deficits. There was a disclosure in this connection which suggests that the net profits of the industry are purely fictitious, or ought not really to exist if electricity concerns acted properly. Alderman Walker, for the employers, stated that he was prepared to call evidence from every district to show that, if proper allowances were made for depreciation, obsolescence, reserves, &c., the gross profits shown in the returns of electricity undertakings would be non-existent. Now we know; and if we made the deduction that the electricity industry is not in a financially healthy condition, no blame could be attached to us.

Salesmen Conferences.

The Electrical Development Salesmanship Conferences for the coming session have been arranged; and a very good programme has been brought together. The first item has already been delivered. It was by Mr. W. E. Bush on "A Programme for Intensive Lighting Development." Other subjects which will be dealt with month by month include "Contracting for Pleasure and Profit." It is usually the latter that is the object of contracting, and the pleasure arises out of the profit. Then there is to be a contribution on "The Lost Opportunities of the Domestic Cooking Load." It would have been better to have a paper on "The Misconceived Possibilities of the Electric Cooking Load." At a later date there is to be described the "Relation between the Sales Force, the Advertising, and the Public." However useful, that does not appear likely to be very thrilling. Something more fascinating should be provided by "Electrical Work in the Retail Shop and Store," as well as by "Power and Heat in the Home." Then that difficult problem of the "Development of Electrical Supply in Residential Areas" is to wind up the session.

MICHAEL AND WILL ON THE LAW RELATING TO GAS.*

Reviewed by a Barrister-at-Law.

A new edition—the seventh—of this important work has just been published; Mr. F. T. Villiers Bayly, Barrister-at-Law, being responsible for the work.

Unlike its predecessors, in which the law relating to water, as well as gas, was contained in one volume, the work now appears in two volumes, of which the first, relating to gas, is now published. This course is no doubt due to the increased bulk of the matter necessary to incorporate; but as the second volume will contain the Companies' Clauses Acts and the Lands Clauses Acts, as well as the Statutes relating to water, it will be necessary for readers of the "Journal," who desire to bring their "Michael and Will" up to date, to obtain the second volume when it is available.

For the volume now before us, relating to gas, we have nothing but praise, reserving a little criticism upon the introduction, to which we make later references. It is a matter well within the knowledge of "Journal" readers that, since the sixth edition was published in 1911, there have been important additions to the statutes relating to gas. Perhaps the chief among these is the Gas Regulation Act, 1920; and the exposition and explanation of this Act, and the various Orders and Rules made thereunder, alone render the book a necessity to every gas administrator.

In addition to the introduction, the book is divided into five parts, as follows:

Part 1.—General Gas Acts with Statutory Rules and Orders relating thereto.
Part 2.—Metropolis Gas Acts with Statutory Rules and Orders relating thereto.
Part 3.—Powers of local authorities in England and Wales with reference to gas supply.
Part 4.—Promotion of and opposition to Bills in Parliament by local authorities (*i.e.*, the Borough Funds Acts).
Part 5.—Public Authorities Protection Act, and Conspiracy and Protection of Property Act.

It will be seen, therefore, that the author has well covered the ground, subject to the comment already made with reference to the Companies and Lands Clauses Acts.

The general scheme of the book appears to be to reprint the Acts and notes which formed part of the last edition, making any additions to the notes necessitated by recent decisions, and adding to these Acts those provisions like the Gas Regulation Act which have been passed since 1911. What occurs to the reader, on perusing the notes, is the limited amount of litigation since 1911; yet how radical is the change in the position of gas undertakings due to legislation since that time. The author has not noted the Public Utility Companies (Capital Issues) Act, 1920, except to point out the limited period of its operation. He therefore has not directed attention to the important provision of section 3 of the schedule, whereunder it is possible (subject to the provisions of the section) to redeem out of revenue, in certain cases, capital created or issued under the Act. There have been several cases in which Orders authorizing such redemption have been made; and it might have been useful if Mr. Bayly had mentioned them.

The Gas Regulation Act is set out and noted. The author properly directs attention to the fact that, by section 18, the expression "local authority" does not include a rural district council. It follows therefore that a rural council has no power under section 4 to appoint a gas examiner, and no power under section 10 to make application for a Special Order. The Act, however, leaves unaffected any powers a rural district council may possess under the Gas and Waterworks Facilities Act, 1870, and under the Public Health Acts. This point is mentioned particularly, because without a reference to the text of the Act, the reference in the introduction to what is meant by "local authority" seems a little obscure, and the footnote to page 28 ought to be disregarded. On the other hand, the local authorities to whom notice must be given of applications under the Act, in accordance with the rules of the Board of Trade, include rural district councils.

The author has not noted (except quite briefly) the important section 1 of the Act, and refers his readers to the introduction. The notes in the introduction, however, are not arranged very conveniently. The real effect of section 1 is, of course, that, while the Board of Trade cannot reconsider or amend a standard or maximum price fixed independently of the Act, the Board can make Orders adjusting upwards or downwards additions made to those prices to meet the incidence of costs since June 30, 1914. In this way the Act enables control to be kept over alterations in circumstances, while preserving to gas companies the intended benefit of the sliding-scale. Again, it is not a complete statement to say that under the Act gas undertakers "are given freedom to determine for themselves the calorific value of the gas which they will undertake to supply." This power is coupled with the obligation to give notice of the calorific value and to alter consumers' fittings; and though the provisions as to declared calorific value (as contained in an Order) are set out on a further page of the introduction, yet the statement which we quote, taken by itself, is not complete or accurate.

The various Orders and Rules and forms made under the Act are all printed in the volume, together with explanatory notes, and will prove of very great service. They include the Gas Meter Regulations made under section 12 of the Gas Regulation Act, relating to meter testing, and the forms of reports of gas testing prescribed by the Gas Referees, whose extended functions are fully explained in the authors' notes.

Two useful features are the inclusion of the Model Bill clauses relating to gas, which are in Part 1, and the various special but customary clauses to be found in Gas Bills and Orders which are in the introduction. Part 2, relating to the Metropolis, is brought up to date by the inclusion of the later Acts of the three London Companies, while the notes on the remaining parts have been brought up to a very recent date.

The book should be welcomed by all gas administrators and officials, notwithstanding the slight defect in the introduction. It would seem desirable to recast this entirely, instead of merely endeavouring, as the author has done, to graft references to the new laws on to references to the old law and circumstances relating to the industry, many of which are obsolete and of little historical interest.

There is an excellent index; the book is clearly printed; and the appearance of Volume 2 will be awaited with interest.

* "Michael and Will on the Law relating to Gas and Water," by F. T. Villiers Bayly. Vol. I., Gas. London: Messrs. Butterworth & Co.; 1924. Price 50s.

Fuel Testing in Vienna.

The Testing Department for Fuels at the Technical College, Vienna, was founded in consequence of a suggestion made by, and with the assistance of, the Austrian Gas and Water Association, and was shortly afterwards taken over by the State. Dr. Hugo Strache, who is Professor of Fuel Technology and Principal of the Department, explains that the field of activity of the testing department covers mainly four subjects. All kinds of examinations are carried out of solid, liquid, and gaseous fuels in a calorimetric as well as chemical manner, photometric work, the preparation of heat balances, &c. Each chemical examination is checked by a parallel analysis, as far as the nature of the analysis does not render this unnecessary; and thus a complete reliability of the results is achieved. In many cases industrial concerns desire to have new processes and apparatus worked out by the department, as in most instances individual industrial concerns have not at their disposal the trained staff and apparatus necessary for a scientific investigation. The scientific work of the department is carried on in close association with that of the college which relates to the technology of fuels. The college lectures on the technology of fuels have for their principal object the education and training of students in the sciences of heat and gas. The students work for two years in the laboratories of the college and in the testing department. There are also lectures for those who already possess a knowledge of the subject of heat. So far as is practicable, the testing department is managed on a commercial basis. One result of the establishment of this useful branch of scientific service has been the putting forward of a scheme by industrial concerns to form technical centres at their own cost to deal with heating problems; the idea being that this will prove less expensive than the engagement of heating engineers by each individual firm. Though, as mentioned, the cost of these centres is to be defrayed by the industrial undertakings, they will form branches of the testing department already referred to.

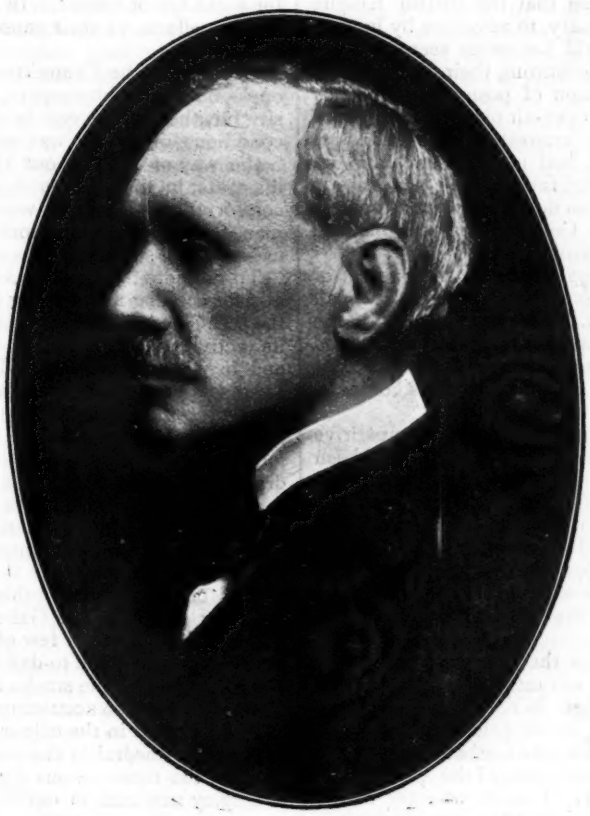
BRITISH COMMERCIAL GAS ASSOCIATION.

GENERAL MEETING AND CONFERENCE IN LIVERPOOL.—SEPT. 29 to OCT. 1.

YESTERDAY, in the Crane Hall, Hanover Street, Liverpool, Alderman H. WADE DEACON, C.B.E., J.P., the Chairman of the Liverpool Gas Company, delivered his Presidential Address at the thirteenth annual general meeting and conference of the British Commercial Gas Association. This, and a paper on "Biscuit Baking by Gas in Liverpool," by Mr. R. E. GIBSON, Engineer of the Liverpool Gas Company, which was read on the same day, are reproduced here. Our report of the other portions of the three days' highly interesting proceedings will appear subsequently.

The Lord Mayor has in most kindly fashion welcomed the members of the "B.C.G.A." to Liverpool, and I should like to express on behalf of the Liverpool Gas Company the great pleasure it had in inviting you to visit this city, and has in wishing you, now that you are here, a very pleasant and useful time.

The "B.C.G.A." held its first Annual Meeting in the neighbouring city of Manchester in 1912, under the Presidency of the late Sir Corbet Woodall. At that time the membership of the Association was limited to about 250, representing 56 p.ct. of the total output of gas undertakings in the country. To-day the number of undertakings which are members is 773; and they represent 92 p.ct. of the total output. The Association has progressed rapidly in its membership, but in influence it has grown even more rapidly. It is a constant encouragement to those responsible for its administration that, from the first day it began its work until to-day, the number of undertakings supporting it and the income from their subscriptions have steadily and unfailingly increased, even during the war.



THE PRESIDENT—ALDERMAN H. WADE DEACON, C.B.E., J.P., Chairman of the Liverpool Gas Company.

At first, as was only to be expected, there was some amount of hesitation on the part of many undertakings as to whether the need existed for such an organization as the "B.C.G.A." There was at that time undoubtedly a feeling, which was rather widely spread, that each undertaking could look after its own interests perfectly well; that each knew its own needs better than any organization could understand them; and that it was better to be entirely free from any sort of obligation to another body. But as time went on, and because of the very skilful and energetic guidance of those who were the leaders of the new Association, it was recognized that much more might be accomplished by united action on large general questions than was possible under the old system. I am glad to say that not only gas companies, but municipal gas undertakings, have united to make the Association the powerful instrument for good that it is to-day.

There never has been, and I am sure there never will be, the slightest desire or attempt on the part of the Association to interfere with the absolute control which each undertaking has over its own affairs. It is because the object of the Association—which I take it is to be of service to all gas consumers, and incidentally to promote and increase the general use of gas—has been steadily kept in view, that so much progress has been made.

Gas undertakings exist, of course, for the purpose of making and selling gas and the bye-products. For economical working we rely on our engineers, who have an admirable Institution of their own, where all matters concerning the engineering and technical side of our work are considered by those who are so well qualified to deal with them. It is an old and well-established body whose authority is recognized by all of us. But there was no corresponding body to represent the equally important commercial side of our undertakings until the "B.C.G.A." was founded.

It may have been that in the earlier history of the gas industry the chief difficulties lay in the production of gas; and it was felt that if the engineer was a capable engineer, he was, without any special commercial qualification, quite equal to the work of selling the gas and other products he made. And as a matter of fact there is no doubt that, generally speaking, he was—otherwise gas undertakings would not have made the progress they did make. But as the growth of the industry increased, and as the processes of manufacture became more and more scientific, and absorbed more of the time and attention of the engineers, and as, also, competition with electric lighting developed with what was—from the gas manufacturers' point of view—unpleasant rapidity, it became apparent that there was a need for some other Institution which would be of special help to engineers and managers on the commercial side of their work. Thus it came about that, under the kindly auspices of the Institution of Gas Engineers itself, the "B.C.G.A." came into existence.

Without exaggeration I may say that the work done by the "B.C.G.A." has proved the great value of regular and habitual co-operation between gas undertakings, and between individual officers, too, and that without such work, and work done by the National Gas Council and the Institution of Gas Engineers, the gas industry would not be in the favourable position it is in to-day. It is a result of which those who are responsible for the administration of the Association may well be proud; for it has not been achieved by accident or luck, but by hard work and the scientific use of imagination and courage.

My impression, formed partly from experience and partly from observation, is that manufacturers were, and perhaps to-day are still, very apt to regard the commercial branch of their business as something which requires less intelligence and skill than the technical and scientific side. It is a natural result of their education and training, and perhaps of the fact that, unconsciously in their subconscious mind (which was an unknown quantity to the early manufacturers, even if we know much more about it to-day), they placed themselves on higher pedestals than those upon which they put mere commercial men. No doubt all know the old classification—bankers, merchants, and manufacturers. I well remember, when I was quite a young man,

a very able and successful chemical manufacturer saying that, in his opinion, the order ought to be reversed, and that manufacturers were more important than merchants, quite as certainly as that merchants performed more important functions than bankers. I do not know whether he held this view in his early days when he had to visit his bankers and persuade them to give him the necessary credit to enable him to extend and develop his works as he did. In any case, I think it is as difficult to say which is the proper order as it is to decide which came first, the chicken or the egg.

In addition to looking with a rather condescending eye on bankers and merchants, the older generation of manufacturers fought shy of advertisement. They thought—I knew many of them—that if they produced an excellent article their work was accomplished, and the public would soon come and want to buy it. Something of that feeling still lingers in many minds, and I must confess that occasionally I have still a slight feeling that advertising is a little blatant and rather vulgar. Of course, I hasten to say that these feelings never occur to me when I see any advertisements issued under the auspices of the "B.C.G.A"! Besides, advertising is now recognized as one of the Arts, if not one of the Sciences. We have seen that the British Empire has thought it wise, even necessary, to advertise by holding such an exhibition as the world has never seen, and the great Railway Companies are decorating their walls and our street hoardings by the exhibition of posters designed by the most eminent R.A.'s. Our open-air picture galleries are indeed becoming so extremely interesting and seductive that if we do not spend a good deal more money than we can afford, it is certainly not the fault of the advertisers. Does anybody now exist who does not know what a glorious flaming essence is the Spirit of Coal? It is unthinkable! Such is the power of advertisement!

There was, as you know, a conference on the subject of advertising held at Wembley recently, and experts from all parts of the world were present. Our own experts of the "B.C.G.A." have no doubt received much information, and will draw, if they have not already drawn, their own conclusions. Even to an ordinary chairman of a gas company certain points are clear.

First, perhaps, is the necessity in this very competitive world to act in advertising on the advice said to have been given on election days by certain unscrupulous political agents—"poll early and poll often." If you advertise at all, advertise well and often. An odd advertisement is probably of little use; but if you advertise so that no one can avoid seeing what you say or do, or have to sell, then some good result may reasonably be expected to follow. This principle is well carried out by the "B.C.G.A.," as you all know.

The second point is that it is the duty of a monopoly undertaking to advertise all the advantages it can offer to the public, in order that, through increased output, there may come decreased cost and lower price. This same point was made by your President (Sir Corbet Woodall) in his address to the first annual conference of the Association, to which I have referred already. I doubt whether in the intervening twelve years it has received the consideration it deserves, and I therefore call attention to it once again. Our monopoly rights confer upon us obligations as well as opportunities. It cannot be too widely recognized that one of those obligations is to educate the public as to the advantages we are able to offer them and the services we can render to them, both individually and collectively.

There is a third point of great importance. The commodity you have to sell, whatever it may be, must be good and suitable for the purpose for which it is intended. If it is not, the public will soon find you out, your sales will fall, and your money spent on advertising will be thrown away. I need hardly say to those assembled here that the commodity we have to offer is of good quality and most suitable for common use. That this is so is shown by the fact of continually increased demand for it in spite of the very serious competition we have to meet.

I presume that everyone present has seen the Gas Exhibit at Wembley; and I take this opportunity of expressing our thanks to those who organized the show. It was a difficult bit of work that the Committee responsible for the gas industry's contribution to Wembley undertook, and right well have they carried it out. They have the right to feel no little gratification both at the absence of any fundamental criticism and at the very general satisfaction expressed with the result of their efforts. Speaking for the moment for the Liverpool Gas Company, who readily contributed their share of the sum asked for, I can only say we are satisfied that the industry in general, and our Company in particular, will obtain full value for the money invested. I use the future tense advisedly, because the results of such an enterprise as Wembley are to be looked for, not so much in business immediately accruing, as in the general stimulus to trade afforded by the impression created in the public mind. This applies not only to the expenditure of the gas industry at Wembley, but to all its expenditure on publicity, both co-operative and individual. Gas furnaces, gas fires, gas cookers, gas water-heaters, are not generally purchased and installed on the impulse of a moment or to satisfy a passing desire. Orders for such permanent additions to home or business equipment are the result mostly of mature, often of prolonged, consideration, and are forthcoming at times of suitable opportunity, rather than when interest is first aroused. It would be difficult—indeed, it would be impossible very often—to ascertain from a consumer, or for the consumer to ascertain for himself, exactly what advertisement or exhibit or poster or other suggestion or piece of information actually led to the placing of an order for a gas fire or cooker. In no business is it more difficult to trace effects to their causes, for they are numerous and complex.

The idea of the Committee in bringing forcibly to everyone's mind the advantage of, not to say the absolute necessity for, the use of gas in all houses under the domestic conditions of to-day was an admirable one. And what better way of carrying out the idea could there be than to illustrate, in the "Seven Ages of Woman," how easy and comfortable the life of a woman, and incidentally that of a man, too, can be made from the cradle to the grave by the use of gas in suitable and economical appliances?

To promote the use of gas in private houses, more especially for cooking and heating purposes, is a matter to which the "B.C.G.A." has devoted a good deal of attention; and its activities have proved of great use to householders and to gas undertakings. In Liverpool, which, though a great seaport, is not a great manufacturing city, it is of vital importance that housewives should continually have brought to their notice the ease and comfort and cleanliness which follow the use of gas fires and cookers. One of the greatest drawbacks to life in towns is the smoke issuing from thousands of domestic chimneys. Though we have some tall chimneys here which are not blameless, yet it is true to say that, in the bulk, the domestic hearths are the greatest sinners.

It is only necessary to think for a moment of what St. George's Hall, the Art Gallery, the Town Hall, the Dock Offices, to name only a few of our chief architectural attractions, would look like to-day if they had not been blackened and disfigured by the smoke from those open domestic fires to which we are so accustomed. Think of the sad change that must occur in the colour of the stonework of our beautiful new Cathedral in the course of only a few years, not to mention the more serious question of decay, if we continue to employ raw coal in our fireplaces and neglect the use of that invaluable commodity which the Liverpool Gas Company is only too anxious to supply. This damaging result to buildings is so obvious that none can miss seeing it; but the effects on human beings, though less obvious, are so serious that, as reasonable people, we ought to devote more attention to the smoke nuisance than we do. I need not say more, for the inestimable benefits that would follow the abolition of smoke in our towns were admirably illustrated by Dr. Saleeby in the interesting lecture he gave in the Town Hall last night.

The "B.C.G.A." does not, however, by any means confine its vision to the area of domestic needs. It knows that there is a far wider field to embrace; and in that admirable periodical publication "A Thousand-and-One Uses for Gas" attention is drawn to existing and to new means for using gas in manufacturing processes. The work which the Association has done, and is doing, is bearing fruit, and I understand that already the number of trades in which gas is used for various processes has been increased to more than three thousand. This is very encouraging; and naturally, as makers of gas, we believe that the more the use of gas is extended in manufacturing operations the better will our manufacturers be able to meet the growing competition for the trade of the world.

In an address of this kind, and to such an audience as

this, it is hardly necessary to point out the advantages of the use of gaseous fuel, such as the saving in capital expenditure, in labour, and in transport; the fact that there are no ashes left to get rid of, no waste of material to fear, no difficulty in maintaining a uniform temperature, the simple and complete control just by the turning on or off of taps.

All these matters are well known to you, and I am glad to say that in Liverpool there are manufacturers who appreciate them also. One of our largest consumers for manufacturing purposes is the well-known firm of Messrs. W. & R. Jacob & Co., who do all the baking in their biscuit works by means of town gas. As you know from your programmes, Messrs. Jacob have invited us all to pay a visit of inspection to their works at Fazakerley, and as President of the Association I take this opportunity of expressing our hearty thanks to the firm for the facilities they have offered, and for their kind promise of hospitality. A paper by the Engineer of the Liverpool Gas Company, on "Biscuit Baking by Gas at Liverpool," will be read a little later in our proceedings; and this afternoon when you visit the works you will be able to see for yourselves a most carefully thought-out system for the successful application of gas in that particular industry.

This is an excellent instance of the advance now being made in the scientific and economical use of gas, and it leads one naturally to make some reference, however slight, to the First World Power Conference held recently at Wembley. At that gathering experts from all over the world met for the consideration of vital problems connected with the supply of power, and there was a general consensus of opinion that in the future struggle for trade that country would benefit most which had the cheapest supply.

In our country we have not the advantage of the great supply of water power possessed by some of our competitors in other countries, and the consideration of the possibility of obtaining a quantity of such power by damming the Severn is only now entering upon its early stages. As we have no oil wells, the one great source of power in our own land is—for the present, whatever the future may bring—coal; and as our stores of coal are being used up rapidly, it is necessary, in the national interests, that the utmost possible use be made of the coal we have. The vital importance of this matter is a subject which the gas industry will have to lay, with all the force it can command, before any Government which considers the question of the power resources of this country.

Our thanks are due to the President of the National Gas Council, Mr. Milne Watson, who initiated, organized, and presided over, the Gas Section of the World Power Conference, and to the authors of the papers presented, for putting on record the salient facts. One of the papers is so important that I make no apology for referring to it in a few words. It was read by the Chairman of our Executive Committee, Mr. F. W. Goodenough, on "Fuel Conservation and Smoke Abatement." In it the author points out that it is a mistake to speak of coal and power as if they were interchangeable terms. In fact, power is only one of the possible services obtainable from coal, and we must think of coal as our source of heat. The heat obtainable from coal by its combustion, or from its products after its carbonization, can be utilized in various ways.

The important point to bring constantly and plainly to the notice of all who are considering power schemes is that the term "power" must be restricted to the limited meaning of "motive power," and not be used to include the provision and use of heat, as such, and that the problem of coal conservation and utilization must be considered as comprising two separate main considerations:

(1) The economic utilization of coal as a source of smokeless, labour-saving *motive power*.

(2) The economic utilization of coal as a source of smokeless, labour-saving *fuel*.

While the answer to the one may be largely—it is by no means wholly—"electricity," the answer to the second is almost entirely "gas and coke."

I am sure that no public man has any desire to injure an industry which is doing great public service and employs well over 150,000 men. It is therefore with confidence that I ask all concerned to give most careful heed to the facts which were so clearly stated in Mr. Goodenough's paper, and the knowledge of which cannot be too widely circulated or too carefully studied and grasped by all of us in the gas industry.

As to whether in any particular case it is more economical to the consumer to make use of gas, or of coke, or of electricity, a wise man will consult some independent expert—if he can find one. But it is safe to say that the use of raw coal is in nearly all cases the very worst method, and the most uneconomical from a long-sighted point of view.

There are various other matters which have happened during my year of office, and to which I might well make reference; but my address is already long enough.

Allow me, however, to say just a few words on a matter which does not, of course, exclusively concern the "B.C.G.A." The Lord Bishop of Liverpool has kindly undertaken to address us to-morrow on "The Worker and his Work—Human Relations in an Industrial Age," and I do not wish to say anything to-day in anticipation of what he may say. Yet I cannot refrain from expressing the opinion that conditions of industry—I do not mean merely the existing conditions, but any conceivable conditions—must involve conflicting interests, and, so long as there are conflicting interests, there must always be the possibility of strife. The great object of reasonable men is to remove, as far as they can, the causes which lead to such violent and really anti-social acts as strikes and lock-outs. Much may be done, I believe, by trying to understand each other's point of view, in spite of difficulties which often undoubtedly exist, and by deliberately cultivating an attitude of readiness to believe in each other's honesty and goodwill.

It is because I believe that co-partnership helps to form that attitude that I am a firm supporter of it wherever it can be applied. I believe that in itself it tends to generate those feelings of common humanity which remind us that we are all alike, men with good points and bad ones, and that we ought, as a matter of duty—not to speak of love—to do our best to work together for the common good.

I cannot bring my remarks to an end without expressing my very high appreciation of the work of the Executive Committee and all the officers of this Association. They make the duties of the President light and most pleasant; and I am personally indebted to Mr. Goodenough, the Chairman, for whose unfailing enthusiasm and energy I have the greatest admiration.

BISCUIT BAKING BY GAS AT LIVERPOOL.

By R. E. Gibson, Engineer of the Liverpool Gas Company.

The use of town's gas for biscuit baking in this country is a development of recent years and another striking instance of the amazing diversity of uses to which gas can be applied. An outstanding example of what it has been able to do in developing the biscuit making industry is found in the factory of Messrs. W. & R. Jacob & Co. (Liverpool), Ltd., at Liverpool.

The phenomenal growth of this modern and highly efficient works is so remarkable that a brief account of its development will be of general interest in these days of industrial progress in which gas plays so important a part.

Early Experiences.

The earliest experience of the firm in making biscuits by gas was by means of a hand-oven having a baking space of about 8 ft. square heated with flat-flame burners. This oven was purchased more than twenty years ago, but was soon discarded. About that time the use of gas for baking wafers was rapidly developing, but no attempt had been made to adapt gas to the heating of travelling ovens.

Mr. W. J. Purdy, Joint General Manager to Messrs. Jacob at Dublin, was the first to conceive the idea; and a small experimental oven was constructed about 20 ft. long and one pan wide. This proved successful from the beginning, and so carefully had it been thought out that it is still in use with but few modifications.

The next development was a trial of gaseous fuel in the heating of the American reel ovens, of which the firm had a number. The original method of firing was by means of anthracite coal, the revolving trays passing over the incandescent fuel. That method was economical as regards the cost of fuel; but it being attended with a certain amount of dust, the conversion to heating by gas proved to be a decided advantage both as regards cleanliness and control. Developing the one-pan travelling oven, another was designed for two pans in width, which, after alteration and improvements, turned out to be an unqualified success. This led to the design of an oven of larger size; and the promise of success was such that, when Messrs. Jacob decided to plan a factory in England to meet the growing trade, it was resolved to discard solid fuel entirely and to commence with gas only for baking. After further trials in Dublin, two large ovens were constructed and sent over to the new factory at Aintree. These ovens were

constructed of wrought-iron plates insulated with asbestos and fitted with burners suitable for consuming producer gas.

USE OF PRODUCER GAS.

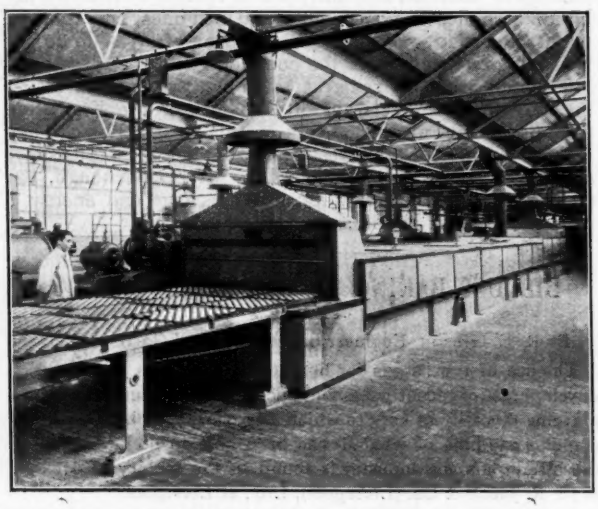
At that time the only town's gas available was that supplied by a small works at Fazakerley, since transferred to the Gas Company by the Corporation, and now demolished. As the supply was considered inadequate, a producer plant was erected, and was worked during the early years of the war with a certain degree of success. The plant consisted of bituminous coal gas producers of about 800 H.P. capacity, from which an output of about 65,000 c.ft. of gas per hour was obtained. The plant was specially designed for the requirements at that time, and was fitted with additional scrubbers, a gasholder for storage purposes, and a steam-driven booster to increase the gas pressure to about 17 in. to 20 in. of water. Very fair results were obtained, but owing to the rapid increase in gas consumption due to the extension of the factory, the output of this plant soon became inadequate.

USE OF TOWN'S GAS.

As already mentioned, town's gas was furnished by the Corporation. The supply was obtained through a 500-light dry meter and a 3-in. diameter outlet pipe, but its use was restricted to soldering irons and pilot lights for the ovens. In October, 1915, the Liverpool Gas Company took over the district, and closed down the newly acquired works, at the same time coupling up the district to an existing trunk main. Messrs. Jacob were not slow to appreciate the change, and availed themselves of this better supply as an alternative to the extension of their own producer gas plant.

SYSTEMS OF HEATING.

When town's gas was first mooted, careful consideration was given to its utilization to the best advantage. At that time an exhibition was being held in Liverpool, lighted by a system of



View of Gas-Heated Travelling Biscuit Oven at Receiving End.

high-pressure gas lighting, which came under Messrs. Jacob's notice. One is led sometimes to wonder how far exhibitions are of assistance to the gas industry in developing the uses of gas. This is a concrete instance of an exhibition being of inestimable value. In the system referred to, gas under pressure was injected through a small nipple, the burner being so designed that the velocity of the gas induced the requisite amount of air.

Another method considered was that known as the "Selas" system, in which both air and gas under pressure were mixed together in certain proportions before entering the burner. While this system appeared to be more economical, it was turned down in favour of the induced air system as in use at the exhibition, mainly on the ground of safety.

PRODUCER PLANT DISCARDED.

Town's gas thus used was found to be more satisfactory than producer gas, and eventually the producer plant was scrapped, and the whole supply for the factory taken from the town mains.

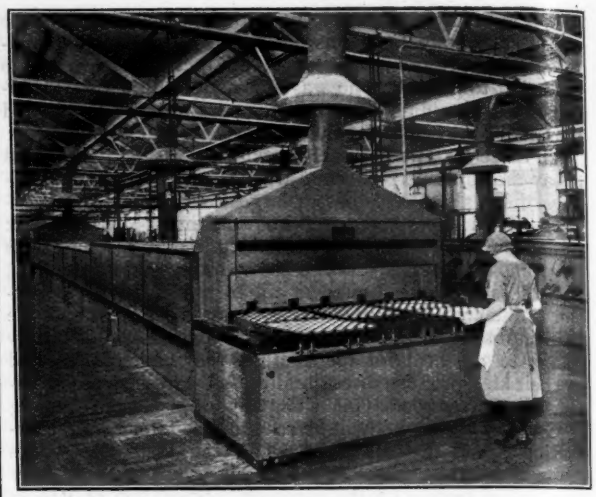
GENERAL DEVELOPMENTS.

The knowledge of these experiments in the heating of travelling ovens by gas gradually leaked out, and the oven makers started energetically to explore the new avenue. Results were satisfactory. Many biscuit factories, both at home and abroad, installed gas ovens for new additions, and in many cases replaced coal and coke fired ovens with the new type.

As the progressive policy of Messrs. Jacob has always led them to the forefront in the type of plant used, the various makes of ovens which have come on the market have been tested, and experiments are still being made by them.

THE PROCESS OF BISCUIT MAKING.

It is outside the scope of this paper to describe the process of biscuit making in detail; let it suffice to say that mixing the ingredients and preparing the dough are done in a thoroughly modern way combining hygiene and efficiency. After the dough has passed through rollers and been reduced to a continuous sheet of material of the correct thickness, it passes under a stamping machine fitted with an ingenious mechanism whereby the biscuits are stamped out of the sheet while the latter is travelling along a table. The newly-formed biscuits are deposited on trays which in turn are conveyed into the biscuit oven.



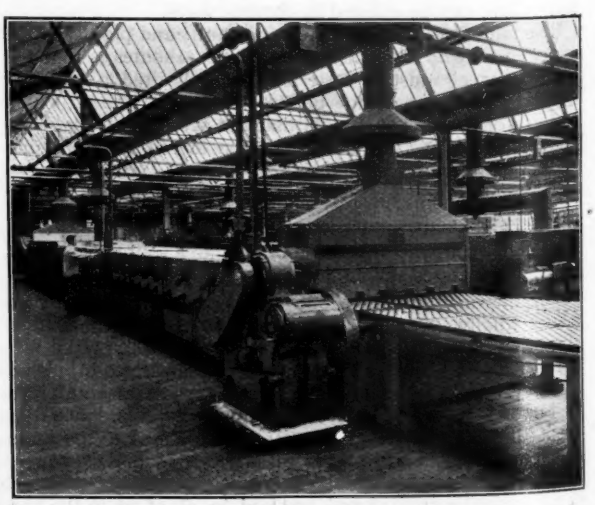
View of Gas-Heated Travelling Biscuit Oven at Delivery End.

DESCRIPTION OF TRAVELLING OVEN.

A modern type of gas-heated travelling oven is about 50 ft. long by 8 ft. 6 in. wide by 4 ft. 3 in. high. The chamber is built of steel sheets with a cavity between the inner and outer sheets filled with non-conducting material to prevent loss of heat by radiation. The baking chamber is heated by two rows of high-pressure burners, the lower row being arranged under the travelling chains and the upper row (containing fewer burners than the lower row) being above the travelling chains for giving the necessary top heat. The return chains are carried by guides under the baking chamber. Absolute control of the heat is secured in every part of the oven, each burner having separate adjustment. A change-over from one class of biscuit to another, requiring different conditions and temperatures, can be made in a few minutes. The oven can be brought up from cold to baking heat within an hour and re-heated each morning in about half-an-hour. Each burner is provided with a separate pilot light supplied with gas from the low-pressure system. Gauges and pyrometers enable the foreman in charge quickly to reproduce any given baking conditions at any time. Thus perfect control and even baking are obtained and ensured at all times.

Some of the advantages of gaseous heating over solid fuel systems are obvious—*viz.*, uniformity of heating, freedom from dust, ashes, and dirt, reduction of labour, and ease of control. The gas-heated oven, moreover, occupies less space and can be placed on any ordinary floor; no special foundations being required. There is no need for a chimney, the waste gases being conducted away from the top of the oven by small flue pipes. At convenient points along the whole length of the oven, side doors are provided for access to the baking chamber.

The gas is supplied to the burners from compressors at a pres-



View showing Gas and Air Regulators and Driving Gear at Side of Biscuit Oven.

sure of about 6 in. of mercury, inducing the necessary air for combustion at the burner nipple. After being adjusted, the correct amount of air is carried in with the gas under a wide range of conditions. The chain drive is fitted with a variable speed gear so that any desired baking period can readily be obtained. Messrs. Jacob & Co. have installed in connection with all ovens laid down since 1919 a separate gas meter to each oven. By this arrangement accurate and regular costing returns can be taken, and the relative merits of different ovens determined.

GAS USED FOR OTHER PURPOSES.

Town's gas under pressure having been proved thoroughly reliable after extensive trials, its usefulness was quickly extended to other industrial purposes, some of which were the means of effecting a considerable saving, as it was thereby possible to shut-off the steam boilers entirely at night and during the week-end, gas being used for maintaining temperatures, where required, by means of gas radiators and fires.

The travelling ovens used for the manufacture of ice wafers, ice cornets, ice cones, and ice cups, to which a separate department is devoted at Messrs. Jacob & Co.'s factory, are all fired by gas; and a gas-fired oven is used for drying and sterilizing all biscuit tins after washing and the removal of old labels. Empty biscuit tins are received back from their customers by the firm, and every tin before being used again is thoroughly washed, dried, and sterilized. In this process of tin cleaning and sterilization town's gas plays an important part.

DRAWPLATE OVENS.

Drawplate ovens specially designed for the purpose have been laid down since 1922, these being the first of this type in which town's gas has been used. It can now be said that the Aintree factory is the first large biscuit factory to be entirely given over to biscuit baking by town's gas.

THE AINTREE FACTORY.

The buildings as now existing comprise two long ground-floor blocks. Full advantage was taken of the opportunity presented by a new lay-out specially to design the buildings and plant to embody the most up-to-date methods of manufacturing biscuits. Cleanliness, light, and ventilation are three of the most important features in the construction. The buildings themselves are situated in extensive grounds, laid out with gardens and shrubbery. Many smaller buildings have been added from time to time.

THE VARIOUS USES OF GAS.

The extent to which gas is used will be most readily realized when it is stated that there are at the present time in Jacob & Co.'s works, both at Aintree and in Dublin—in addition to several different types of travelling ovens, wafer, cornet, and cup machines, all fired by gas, tin driers and sterilizers—numerous radiators, soldering benches, jam boilers, and gas fires, as well as the necessary cooking appliances for the large number of employees who use the firm's canteen.

The success attending the development of gaseous heating in the Aintree factory is due in no small measure to the untiring efforts of Mr. G. N. Williams, the Chief Engineer, and his Assistant, Mr. R. A. Eaton, who deserve great credit for the high degree of efficiency which has been attained.

ADVANTAGES OF TOWN'S GAS.

While town's gas, when compared with solid fuel or producer gas, costs more as fuel only, it has many advantages which turn the balance in its favour, especially in the case of a food factory —for example:

(1) Cleanliness—no smoke or ashes.
(2) Reliability of control.
(3) Uniform calorific value.
(4) Baking temperature quickly obtained.
(5) It may be shut off at a moment's notice, or raised and lowered to suit any requirements.

In conclusion, the author wishes to acknowledge his indebtedness to Messrs. W. & R. Jacob & Co., Ltd., and Captain C. W. Jacob, for much of the information contained in this paper, and for the illustrations.

[*Our report will be continued next week.*]

Gas Referees' Notification.

The Gas Referees (Prof. C. V. Boys, Mr. W. J. A. Butterfield, and Dr. J. S. Haldane) have issued a supplement, under date of Sept. 15, to their General Notification of June 15, 1923, which was re-issued on Dec. 15 last. This supplement sets out some further variations of the instructions relating to the carrying-out of tests, &c., to come into force as from to-day. This supplement itself is not on sale, but copies will be supplied by the Referees to gas undertakings, local authorities, and gas examiners for whom the General Notification issued in June of last year has already been prescribed. The variations and additions contained in the supplement are, however, incorporated in the General Notification as "re-issued Sept. 15, 1924," copies of which re-issue are now on sale by H.M. Stationery Office, Imperial House, Kingsway, London, W.C. 2, and Branches, price 1s. net.

INSTITUTION EDUCATION SCHEME.

MEMORANDUM ON THE REPORT OF EXAMINERS.

In accordance with the resolution of the Board of Examiners, the following Memorandum based upon the Examiners' Report to the Advisory Committee has been prepared by the Organizing Secretary, Mr. Walter Hole, for publication in the Technical Press.

Now that the first twelve months of operation of the Education Scheme are past, and the results of the first examinations have been published, it may be of advantage and guidance to both students and teachers if a brief reference is made to a few of the outstanding features noted in connection with those examinations.

The total number of the candidates who sat for examination was 60, divided between the various grades as follows:

—	Candidates Examined.			
	Ordinary Grade.	Higher Grade.	Passed O.G.	Passed H.G.
Internal students—				
Gas engineering	22	6	19	4
Gas supply	6	1	6	0
External students—				
Gas engineering	8	4	6	2
Gas supply	3	2	3	0

Diploma in gas engineering—
Candidates 7
Successful 2

Passed with distinction—
Gas engineering—ordinary grade . . 2
" " —diploma 1

One paper was returned unworked.

There were no candidates for the Diploma in Gas Supply, owing to the stringent requirement of 30. Section III. This states that the candidate must possess the Higher Certificate in *both* Gas Engineering and Gas Supply. But one of the conditions of sitting for the Higher Examination in Gas Engineering is that the candidate must be employed on the practical side of gas manufacture. While it is frequently possible for an engineering student to obtain practical experience of distribution, it is very seldom that a supply student can obtain a similar experience on the manufacture side, especially in the case of the large undertakings. The requirement in question was therefore amended at the Annual Meeting of the Institution in June last, so as to provide that students may enter for the Diploma "who have obtained the Higher Certificate in the subject (Gas Engineering or Gas Supply) for which they desire to obtain a Diploma, and have passed the Ordinary Examination in the other subject, Gas Supply or Engineering, as the case may be." This has eased the situation materially; and it is hoped that, as a consequence, there will be many more candidates for this distinction next year.

Considering the fact that the scheme has been so short a time in operation, and that the arrangements for the education and examination of students in the industry have been passing through a transition stage, the number of candidates sitting for examination, though small, is not considered unsatisfactory. For the Session 1924-5, a very considerable increase in the number of students presenting themselves for examination under the scheme may be anticipated.

THE REQUIREMENTS.

In connection with the scheme itself, it has been found that candidates, as a whole, have not fully realized the standard required of them for success in the examinations; and therefore a brief statement on this point may elucidate matters for the future.

Ordinary Grade.

The Education Scheme, as is well known, is divided into three stages, advancing from the Ordinary through the Higher to the Diploma Grade. It is, however, well recognized that not all who take the first course will have the wish, ability, or opportunity to press forward to the higher or to the final stage. There must inevitably be a falling-off in numbers as each higher grade is reached.

In Gas Engineering the Ordinary Grade students are required to have a knowledge of simple detail of gas-works practice and plant, and be able to give sketch details relating to the elementary questions. In the same grade in Gas Supply a knowledge of the elements of distribution and utilization of gas (including measurement, proportioning of pipes, lighting, and heating) is required.

Higher Grade.

In the Higher Grade in Gas Engineering an advanced degree of knowledge in the same subjects is required, and the assessment of the value of the candidate's paper will be made on fuller detail, and on evidence of more practical observation of the operations of the industry both on the engineering and the chemical side than is required of the Ordinary Grade candidate. In the Higher Grade Examination, a thorough knowledge of chemical opera-

tions, together with an ability to draw and sketch neatly and intelligently, will be expected of all candidates. It will therefore ultimately be understood throughout the industry that those who pass this examination are students who have given evidence of a close knowledge of gas engineering combined with the cognate subjects of chemistry, mechanics, &c., and who, in the opinion of the Examiners, are fitted to go forward and present themselves for the Diploma Examination after a further two years' experience and study.

Similarly, of candidates in the Higher Grade of Gas Supply, there will be required an advanced all-round knowledge of distribution questions (including internal and external lighting; the use of gas for domestic and industrial heating and power purposes; systems of maintenance; and installations and applications of high-pressure gas); a knowledge of physics and chemistry as applied to lighting, heating, and power problems; and a general knowledge of electricity in all those fields of usefulness.

The Diploma.

In both Engineering and Supply in the Diploma Grade, candidates will in future be admitted who are qualified by having passed (*a*) the Higher Examination in the subject (Gas Engineering or Gas Supply) for which they desire to obtain a Diploma, and (*b*) the Ordinary Examination in the other subject (Gas Supply or Gas Engineering, as the case may be). Candidates must also possess a sound knowledge of the cognate subjects, a good general education, and be upwards of 23 years of age.

The examination comprises:

(*a*) The submission of a thesis on original work, which in itself must give evidence of individuality of thought and a thorough grasp of the scientific principles involved, though the subject-matter may relate to works designed by those under whom the candidates are working, or to chemical investigation carried out to others' instructions.

(*b*) An examination by written questions. In regard to this, the object is not to set trip questions, but to obtain from the candidates evidence of the extent of their knowledge. At the same time it is neither required nor desired that candidates should be verbose and fill up sheets of paper with redundant explanations. Consideration will be given to a candidate's capacity for expressing himself in terse, lucid, logical sentences, well composed of good English. The questions set will in short be framed so as to discover the candidate's general knowledge of gas-works practice, chiefly having regard to the construction, working, and scientific and economical control of the several sections of plant.

In Gas Supply, a fully advanced knowledge is required in all the subjects covered by the Higher Grade, and, in addition, questions will also be set on the flow of gas in mains, the principles and measurement of illumination, the theory and practice of furnace construction, legal obligations in connection with supply, &c., such as will closely test the candidates' general capacity.

In addition, both in Engineering and Supply, candidates will be required to show a knowledge of current developments, as indicated by the industry's Technical Press, and generally demonstrate that they take an all-round thoughtful interest in the progress and development of the industry.

(*c*) The oral, or third, part of this Diploma Examination gives an opportunity to the candidate to make more clear, if he is able, by *viva-voce* examination, the knowledge and capacity he has displayed in his thesis and the written examination. It is desired by this means to afford equality of opportunity for all, inasmuch as some candidates may be better able to express themselves orally than in writing.

The assessment for the Diploma is therefore made on the three parts considered together; but, if the candidate fails in one section of the examination, he may take that section again in the following year, and so, if possible, qualify eventually for the Diploma.

Criticism of the First Results.

Such being the requirements of the scheme in outline, the question arises as to how these have been met by the candidates. In this respect there has been a marked difference in the two classes of candidates. In the case of the "internal" or college-trained students the quality of the work has been generally good. The students are evidently having a wide and excellent training, which must be of the utmost benefit to them and to the gas industry. The work of the students from one of the Colleges, as regards sketches, phrasing, writing, and matter was of exceptionally good quality. The weakness of these internal students, revealed to some extent in the engineering papers, but still more so in the answers to the supply questions, is the absence of individual thought and expression. There was a marked ease in tackling the questions set by the teacher, combined with a remarkable similarity in the replies given from the same centre, which made it difficult to discover independent thought, or to assess the grasp of his subject possessed by the candidate.

In connection with the external students, the examinations have revealed serious deficiencies. It has already been stated that candidates have appeared not to realize the high standard that must be demanded if certificates and diplomas are to have a value that cannot be disregarded. This was almost to be expected in connection with such a new scheme. In view, therefore, of the declared intention of the Examiners to set questions in future which will combine a demand for chemical, physical, and general knowledge of a higher order than those set this year, it may be well to indicate some of the directions in which failings were specially noticeable.

The drawings and illustrations were generally weak, and in many cases roughly and incorrectly executed. It is easy to be equipped with a few simple drawing instruments and aids; and illustrations made by their means much improve the style and appearance of a candidate's paper. In many cases, where knowledge was evidently possessed, the capacity to express it well was limited. In the Higher Examination, and especially in that for the Diploma, a knowledge of English and its correct use must, as already indicated, be insisted upon. Some candidates again failed lamentably in presenting their facts in proper sequence, or with due regard to their relative importance. A jumbled statement may contain the facts essential to the answer, but the way in which that answer is set out is of great importance, and the art of logical and lucid presentation should be studied.

Greater attention must also, it is clear, be given to the ancillary subjects, the importance of which cannot be over-emphasized as constituting the essential foundation of the specialized knowledge required on a gas-works or on a district.

With the exception of those of the two candidates who were awarded the Diploma, the thesis presented by candidates for the Diploma did not reveal evidence of independent thought, or a firm grip of underlying scientific principles. Both in respect to the thesis and also the written portion of this very important examination, the Examiners always have in mind that the industry will expect candidates who have been granted the Diploma subsequently to show themselves competent not only to initiate and direct technical operations on a works or a district, as the case may be, but also to frame a clear, concise, and well-reasoned report on matters technical, administrative, or commercial, with all the relevant facts lucidly and logically presented. To afford greater opportunity for candidates to give proof of such ability as well as of their technical knowledge, it has been decided to divide the written portion of the Diploma examination in future into two parts, to be taken at two sessions on the same day, each of three hours' duration, instead of (as in this year's examination) one continuous session of four hours.

In conclusion, it should hardly be necessary to say that the foregoing criticisms have been made in no deprecating or discouraging spirit, but with a sincere desire to guide the student, assist the teacher, and make the Education Scheme of unquestionable practical value alike to those engaged in the service of the industry and to the industry itself.

Gas Industry in Canada.

Some reference to retort gas manufacture in Canada was made in a contribution to the First World Power Conference by Mr. B. F. Haanel, B.Sc., Chief Engineer, Division of Fuel and Fuel Testing, Canadian Department of Mines, Ottawa, who stated that town gas is manufactured in practically all cities and large towns in Canada. Coke-oven gas up to the present time has not been used there for domestic purposes. The quantity of gas coal required annually by the town gas plants of Canada is about 650,000 tons, of which by far the larger portion is consumed in Montreal and Toronto. Practically all is imported from the United States, The reason for this has been ascribed to the unsuitability of Nova Scotia coal for such purposes, and the high cost of that coal due to transportation charges from mines to points of consumption—so far as the east is concerned. Western Canada has been in the habit of using imported coals not only for gas making, but for other purposes, irrespective of the value or suitability of local fuels. This unfavourable situation is, however, rapidly changing, and it is not improbable that the demand created for a good gas coal for the manufacture of a domestic gas will serve to locate a source of such coal from out of the enormous fuel resources of Western Canada, or demonstrate satisfactorily to present consumers of these coals that suitable gas coals are already mined and can be produced in sufficient quantities to meet the demand.

Gas Producer Trials with Peat.

Mr. B. F. Haanel, B.Sc., who is Chief Engineer to the Division of Fuel and Fuel Testing of the Canadian Department of Mines at Ottawa, has made reference to a number of tests, in gas producers of different types, of samples of bituminous, semi-bituminous, and lignitic coals and peat. The most successful tests, he says, were those carried out with peat in a gas producer constructed by Messrs. Körting Bros., of Hanover. This producer was similar to several which are in successful operation in Germany, Sweden, and elsewhere, and was erected, complete with gas engine, in the Fuel Testing Laboratories at Ottawa. The plant was of 60 B.H.P., and it was assumed would offer no difficulties to the gasification of Canadian peat. Exhaustive tests, however, showed that the producer could not deliver a gas sufficiently clean for consumption in a gas engine, and that the trouble could not be eliminated by re-designing the gas-purifying system. The producer was therefore re-designed and re-built by Messrs. Körting, and re-erected in Ottawa. Subsequent exhaustive trials, involving the consumption of about 250 tons of peat fuel, completely demonstrated that Canadian peat with a moisture content of not over 35 p.ct. could be efficiently gasified in a producer of the type in question. Peat is one of the easiest and most satisfactory fuels to gasify in a producer, and should meet with favour in suitable localities where a load up to 1000 B.H.P. can be utilized.

INSTITUTION OF PUBLIC LIGHTING ENGINEERS AND SUPERINTENDENTS.

Abstracts of Papers read at the General Meeting.

An account of the proceedings at the first general meeting and conference of the Institution of Public Lighting Engineers and Superintendents, together with the Presidential Address of Mr. S. B. Langlands, was given in last week's "JOURNAL," p. 931; and to complete the report, we now publish abstracts of the papers submitted, and those parts of the discussions which are of interest to the gas industry.

ELECTRIC STREET LIGHTING MAINS IN GLASGOW.

By R. B. MITCHELL, M.I.E.E., of the Glasgow Corporation Electricity Department.

This paper was read, in the absence of the author, by Mr. Davidson Berry, Mains Superintendent.

Mr. Mitchell traced the development of electric street lighting in Glasgow from the date of its introduction in 1893. He discussed the various methods of cabling, and stated that overhead mains were becoming the general method in Glasgow where at all possible, owing to the great advantages over underground cables in respect of lower cost and cheaper erection. All new installations since 1919 have been fitted with 250-v. gasfilled lamps, used in parallel circuits of 5 to 7, the wiring being all overhead; and time switches are used for the control, the sub-circuits being switched in and out by relays actuated by the current in the main circuits. Where lamp standards are used, these are supplied and erected by the Lighting Department. The following switch gears are in service: Arc starters, 42; time switches, 65; relays, 35.

He also devoted part of his paper to a description of the Glasgow arc starter, an apparatus designed and patented by Messrs. Lackie, Calderwood, and M'Ewen, of the Electricity Department, and devised for the switching on of street arc lamps with an interval between each group. In the electric street lighting of Glasgow, the total number of arc lamps employed is 1064; of gasfilled lamps (200-1000 watt) 847; and metal filament lamps (60-150 watt) 1240. The number of miles of cable for street lighting is as follows: Underground, 155; control, 20; overhead, 40; housing areas—Mosspark, 11¼; Kennyhill and Riddrie, 7.

Regarding cabling, the author stated that the vulcanized india-rubber cables and pipes did not prove too satisfactory in practice. The rubber, as a vegetable product, decays, and the alternate wetting and drying to which cables are subjected tend to weaken the insulation and cause breakdown in time. The cable had not a reasonably long life, and bitumen sheathed cables were tried in a number of runs, but experience of bitumen cables in pipes was also unsatisfactory. As with rubber, the subjection to alternate wet and dry conditions, and the softening effects of coal gas, deteriorated the bitumen sheathing, and in time the cable broke down. The life of a bitumen cable and pipe may reach twenty years, but in many cases is much shorter than this. Where bitumen cables are used, they ought to be laid solid—that is to say, placed in troughing and filled-up with bitumen or pitch.

Discussion.

The PRESIDENT said they were indebted to Mr. Davidson Berry for giving them, at short notice, an intelligent conception of Mr. R. B. Mitchell's views on this subject. Twenty years ago nothing else obtained for street lighting but gas; nowadays lighting engineers and superintendents must be prepared for a mixture. So far as Glasgow was concerned, he was bound to say that it was well served in having the switch arrangement described in the paper for its arc lamps.

Mr. C. S. SHAPLEY (Leeds) said he wanted to remove an impression created by the paper that the Gas Department in Glasgow were blowing their gas in the air. The statement was made that "the subjection to alternate wet and dry conditions, and the softening effects of coal gas, deteriorated the bitumen sheathing, and in time the cable broke down." An observation of this kind required modification, especially when it was shown that these cables were put in alongside 2-in. cast iron pipes or mains. He had seen the annual reports of the City of Glasgow Gas Department for a number of years—certainly since Mr. J. W. M'Lusky took over control as Engineer—and he was bound to say that the leakage account in Glasgow compared favourably with any other city he knew of. Since this was the undoubted position of matters, he wanted to correct the statement on behalf of his good friend, Mr. M'Lusky, who at the moment did not happen to be present to defend himself.

Points of electrical interest in the paper were afterwards discussed by Messrs. M. H. Wardle, City Lighting Engineer, Liverpool; Richard Robertson, Public Lighting Superintendent, Dundee; R. Harvey Minshall, Lighting Committee, Sheffield; and J. F. Colquhoun, Public Lighting Engineer, Sheffield.

Councillor J. TAYLOR (Bolton) remarked that in his town electricity only supplied about 2 p.ct. of the illumination of the streets. In Bolton, they were continuing to work with gas, and the conditions there were generally conceded to be good. They had been operating largely in the past at high pressure, but he was able now to report that certain research work had given satisfaction at low pressure. Personally, he did not think that the presence of coal gas in the streets was an indication of leakage. Might there not be something in the point that Glasgow was the centre of a considerable mining area?

Mr. DAVIDSON BERRY, in the course of his reply, said Mr. Shapley had taken the author to task about the presence of coal gas in the ground. There was no desire to imply that the Gas Department of Glasgow were responsible for this, but the fact remained that there was a good deal of coal gas in the ground. One met it every now and again, and they were bound to agree that coal gas had a very deleterious effect on bitumen cables. He would not go the length of saying that the presence of coal gas constituted the main reason why bitumen was unsuitable for cables in Glasgow, but it was undoubtedly a factor which had to be taken into account.

Mr. C. S. SHAPLEY: Then it is not so much coal gas as bitumen you are getting at.

The PRESIDENT, in calling for a vote of thanks to the author and the reader of the paper, said that for many years he had the privilege of being Distributing Engineer to the Gas Department in Glasgow. From the experience he had acquired then, and since in his present post as Lighting Superintendent, he could testify to the fact that the gas-mains in Glasgow were as good as those to be found in any other city. If there had been trouble through the percolation of gas in the streets, it had been infinitesimal.

PROJECTED LIGHT.

By HAYDN T. HARRISON, M.I.E.E., of London.

The great increase in fast road traffic has resulted in two distinct methods of lighting—namely, the method adopted by the municipal and county authorities of illuminating by means of light sources on standards placed at intervals, and that adopted by the owners of vehicles—headlights or projectors mounted on the front of the vehicles. Motorists, in order to prevent accidents, find it necessary to use their own powerful lights in many cases where the streets are already lighted by the local authority. For the safety of the public, a minimum direct illumination of 0·1 foot-candles is necessary, but the road authorities of to-day often provide less than one-tenth of this figure. In such circumstances the driver of a car must continue to use his headlights when passing through streets and highways illuminated by the local authority, which practice is deplored and condemned in all civilized countries, though it must be admitted to be necessary if the local authorities do not increase their illumination to the standard mentioned.

It is advisable to emphasize here that consideration is given only to the illumination of streets or roads, and not the adjacent houses or front gardens, concerning which complaint has sometimes been received that these private gardens are not properly lighted by the public authorities. Consideration is not limited to the plane surface of the road, for the reason that no roads have a plane surface, all being of an irregular nature. It is of more importance that the irregularities, obstacles, &c., on the surface of the road should be made visible than the plane surface, if such did exist. Looking at it from this point of view, it follows that the term street or road lighting is incorrect, as the object of such lighting is to illuminate or make visible obstructions, pedestrians, or vehicles on the road. Thus it is not the case of illuminating a horizontal surface, but surfaces projecting from the horizontal. It also follows that there is not much interest in illuminating objects projecting above (say) 10 ft. from the road surface, for such objects would not interfere with pedestrian or vehicular traffic.

Therefore the objects required to be made visible are contained within a vertical area (say) 10 ft. high multiplied by the width of the road, which we will take, for example, as 40 ft.—*i.e.*, within an area of 400 sq. ft. This is a very different problem from illuminating the whole surface of the road, which, if the light sources were spaced at 200 ft., would be 8000 sq. ft. Furthermore, the illumination of the horizontal road surface becomes increasingly difficult as the distance increases from the light source, due to the angle of incidence. A vertical surface at 200 ft. distance from a light source 10 ft. high is illuminated to an intensity 20 times as great as the horizontal surface would be. Thus, taking the minimum direct illumination as the controlling factor, the luminous energy required is often 400 times less than if an equal minimum horizontal illumination were necessary. But this would be of little importance were it not for the distance factor, as it is the solid angle which has to be considered. In order to simplify the calculations it is not proposed to consider the solid angle, but only to deal with lumens which include the solid angle and candle-power.

It has been shown that it is only necessary to consider a vertical area (say) 40 ft. wide. To produce 0·1 foot-candle at a distance of 200 ft., 4000 c.p. would be required over an angle of 12°; at 150 ft. 2250 c.p. over 15°; at 100 ft. 1000 c.p. over 22°; and at 50 ft. 250 c.p. over 40°. The total luminous energy to provide this degree of illumination to a height of 10 ft. would not exceed 1000 lumens, or taking it in both directions (up and down the road), 2000 lumens. On the other hand, if the light source had a circular distribution in the horizontal plane, the lumens necessary to produce the same illumination at the distant point would be 12,000, to which must be added the various other zones.

All light is projected or radiated from the source, but the term projected light is now generally used in connection with a reflector which concentrates the luminous flux into an angle less than the normal distribution. The flood lights used in the British Empire Exhibition projected 70 p.ct. of the luminous flux produced within an angle of 40°, a concentration which had hitherto not been obtained with electric incandescent lamps, and which resulted in 350,000 c.p. being obtained with a consumption of 100 watts. Other types of flood lights or projectors only concentrated to within (say) 30°. The author stressed the importance of considering the advisability of projecting the light for the purpose of efficiently concentrating it upon such parts of the streets or roads as are used by the public,

with the object of attaining sufficiently high illumination to allow that motorists and others may dispense with their headlights in populous districts without endangering the safety of the public.

In highways or country roads used by pedestrians and all classes of vehicular traffic, which are either moderately lighted or not lighted at all on account of the expense, the author suggested that by using highly concentrated projectors the cost of such lighting could be brought within practical limits, by utilizing highly concentrating projectors at intervals of (say) 1000 ft., or five to the mile, taking 100 watts per projector. But in such cases the concentration of light would need to be so high as to cause excessive glare, should such lights be visible. In order to avoid this, the concentrated light sources should be below the level of the eye; and Mr. Harrison has devised a system of louvres which, with stationary light sources, would ensure that they never attained the level of the eye, the illumination adjacent to the light sources being produced by pilot lights on the top of the pillars containing the main apparatus.

In the course of a few observations supplementary to the paper, Mr. Harrison said his contribution was not to be confused in any way with the lighting of streets in big towns. It was more an attempt to deal with the situation in outlying districts.

Discussion.

The PRESIDENT remarked that it might interest the members of the Institution to know that in the latest scheme of street lighting in Glasgow they were taking all the main routes for fast-going traffic—north, south, east, and west—and lighting accordingly.

Mr. A. B. SPEARS, Edinburgh, representing the Automobile Association and Motor Union, said he had no intention of referring to the technical side of this question, which of course could only be properly dealt with by experts. Neither had he any intention of alluding to the comparative merits of electricity, gas, or oil as illuminants. On broad lines, however, he was going to contend that the motorist to-day required lighting very much in advance of what used to prevail. The old-fashioned idea was that a light was sufficient if it enabled people to get home, and, at a later stage, assisted in the prevention of crime. His contention was that the requirements of the motorist to-day fell into three distinct groups: (1) Illumination by the motorist on his, or her, own car or motor cycle; (2) extraneous lighting, provided by street lamps on buildings adjacent to roads or streets; and (3) warning lights to indicate dangerous places, to prevent accidents at cross roads, or to indicate some permanent or temporary obstruction. In each group they were confronted with natural difficulties (as distinct from economic)—namely, rain, snow, fog, and wind. With regard to the first group, it was clear that the motorist could not himself overcome the trouble by providing more and yet more light. That would have the effect of inconveniencing and, perhaps, endangering the lives of other road users. He supposed they were all aware of the controversy which had raged round this subject, and which ranged from dazzling head lights to cyclists' rear lights, and covered such points as dimming, dipping, spot lights, &c. Most of them were cognizant of the fact that a Departmental Committee had been considering the question for some time, and during the past two or three years had issued interim reports. With regard to street lighting, it seemed to him that they needed most of all an international standard. For instance, there was a village in Wales where lighting was maintained both day and night for reasons of economy. On the other hand, many other towns and villages lighted their lamps in the winter months only, but not when the moon was full. As regards trees on highways, leafy branches, when windblown, cast elusive shadows which were disconcerting and might lead to accidents. Traffic on the roads at night was bound to increase. In point of fact, detailed observations taken throughout continuous periods proved this, so much so that the Automobile Association had instituted last spring a very necessary and desirable night patrol service.

At this point the discussion of Mr. Haydn Harrison's paper was adjourned.

STREET LIGHTING AND VISIBILITY.

By EDWARD J. STEWART, M.A., B.Sc., Glasgow Corporation Lighting Department.

Candle-power of source, distribution of candle-power from the source in its system of reflectors and refractors, mounting-height, position, and spacing are of obvious importance in securing particular degrees of illumination in a street and of visibility of its contents. For the theoretical street of (say) the maker's catalogue, no other consideration is required, unless the fixing of the "class" of the street—business, residential, and so on. But in the actual street, first, the visibility of objects is not necessarily strictly proportionate to the illumination, and, secondly, there are other factors which affect both illumination and visibility.

The provision of a certain number of units of certain candle-power, or of a certain flux of light on the street, or of certain foot-candles of illumination, average or at prescribed points, may have to be taken as legal criterion (say) to satisfy a public lighting authority of the performance of a contract. Some result, however, which can less easily be set down in figures, but which is expressed in the vague phrase "good lighting," or, one may suggest, "good visibility," is needed before the general public or the conscientious official of the lighting authority is really satisfied. It is in giving the public what it wants, at the same time leading hitherto loose and confusingly various individual preferences to become wants for the right kind of lighting, that the public lighting authorities and their engineers and superintendents have so useful a field.

On their work the eye of the ordinary user of the street is the final judge. You may tell a pedestrian that fittings and their positions are all admirably calculated to safeguard his eyes from glare, and to yield a practically uniform illumination, sufficiently high according to a recognized scale. If he says he thinks the street dull, it is difficult to convince him that he is wrong. You may assure a motorist in the same street that the illumination has been specially designed for his benefit, and he may complain that he cannot see people coming out from the pavement 50 yards ahead, and that recurring glare is disconcerting. It will be difficult to convince him that the lighting could not be improved.

Should any user of a street be involved in an accident at night, either as injured or injurer, he is likely to attempt to shift the blame and any claim for damages on to the shoulders of the local authority, on the ground of "insufficient light," even though the same accident might have happened in broad daylight. Photometric measurements may or may not convey a definite impression to a jury. Even with statistics and plans, one can form a correct notion of the visibility at a "locus" only by actual sight of the place. In the legal aspect, the opinion of the expert regarding lighting might be taken by the layman as final, if his numerical standards were officially adopted; but, in deciding his own "feeling" whether the lighting of a street is "satisfactory," everyone will accept the judgment of his own eyes only.

Also there is not, yet, an eyesight test for drivers of motors or other vehicles through the streets. Perhaps that will come—and one for pedestrians before they are allowed to cross the busier thoroughfares. Further, the standard of judgment of street-lighting by the public does not remain constant, but rises with the progress of the lighting itself. The person who has been brought up in the country and wandered without thought of anything amiss along pitch-dark roads, will, after a few years' residence in town, clamour as nervously as the native for the safety of still greater illumination. Those of us who lived in town when flat-flames were the only light, and were satisfied, became equally satisfied with nothing less than the always increasing candle-powers which prevailed at each successive period. Every brightening of a street stirs discontent with the lighting which formerly satisfied in other streets or towns. The lighting engineer, in trying to satisfy the public demand for light, is creating dissatisfaction. It may be asked whether the power to discern objects at certain distances varies not only broadly with the illumination, but also with the difference from the illumination to which the observer has been accustomed in similar conditions.

Street-lighting has thus a psychological criterion. It is this psychological element, together with other incalculably variable factors, that forbids the circumscription of street-lighting into a few formulæ. Standardization, for the sake of efficiency and economy, is one of the prime needs of street-lighting, both at large and in reference to any single lighting department; but that does not obscure the value of remembering that street-lighting demands recognition of the existence of many individual problems. It is all the more desirable that the onus of carrying out this function should be laid upon one responsible department. Fortunately, certain general methods can be suggested as good practice in any normal street, also certain general specifications of plant. A lighting engineer with control of these resources can ensure that the application is flexible enough to give the best visibility possible of the particular objects in question. He can pay attention to special points in streets demanding special lighting; he can meet complaints, if they be well founded. He can meet his own complaints. The lighting superintendent ought to be even less easily satisfied with his own effects than the public.

The author then went on to deal with the functions of street-lighting, considering them under the following headings:

1. The revealing of stationary and moving obstacles, particularly pedestrians, not visible by lamps carried by them, to other traffic, especially drivers of fast motors.
2. The revealing of the route to drivers and pedestrians, varying in degree from a general outlining of the way, with illumination sufficient to show sudden bends, cross-roads, and obstacles in the roadway, to a more exact vision of all objects from side to side of the street in a continuous illumination.
3. The revealing of names of streets, numbers of houses, &c., traffic warnings, and other signs.
4. The revealing of all objects in the street to the police, with particular reference to those in entrance-ways and other recesses.
5. Legibility—at all places, or at some—of (say) a time-table, or an address on a letter.
6. The recognition of passers-by.
7. The provision of a cheerful and pleasing appearance at night.
8. The attraction of traffic to the street by the degree or quality of its lighting.
9. The suitable illumination of architectural features.

In the next section of the paper, the methods of testing the effect are outlined, and in the final section the factors concerned in visibility are treated in detail—indeed, the treatment of the entire paper is comprehensive.

Discussion.

The PRESIDENT said that the valuable paper contributed by Mr. Stewart was open for discussion, and his suggestion would be that this and that by Mr. Harrison should be discussed together. Mr. Stewart's contribution dealt with every phase of street lighting effectively and in plain and understandable language.

Mr. HARRISON congratulated the writer on having put on record a

large volume of useful experience. They had been needing such a record for years, and he felt that the paper just submitted would prove to be a reference one in the future. Within the compass of this contribution, they had received from Mr. Stewart more value than could be found in all the text books hitherto written on the question of street illumination and cognate subjects. Already in its short existence —one year—the Institution had probably done more than any other kindred body could have done. As regards the details of the paper, he could touch but only lightly upon them, but the issue was one which, after all, bore greatly on the psychological question. By that he meant that the engineer who had to deal with street lighting had a very difficult public to please. The factor that was looked at more than any other was the question of cost. There was always uppermost a desire for care and economy in spending the money of the ratepayers. From experience, however, he had found that even when street lighting was inadequately carried out, the expenditure represented as much as 70 p.ct. to 80 p.ct. of the money which would have given adequate lighting. It seemed to him that the real practical problems of street lighting could only be solved by means of the suggestions which were embodied in Mr. Stewart's paper, and by a careful study of the psychological aspect of the case. He noticed that Mr. Stewart did not lay a great deal of emphasis on the specifications of results from a photometric point of view, so far as Councillors or members of Lighting Committees were concerned. He (Mr. Harrison) agreed with him. While this was so, he felt they ought to develop and collate their scientific and technical knowledge. They must have records of all good results obtained, with data as to how they were got. Personally he had not found it possible to accompany the members on their tour of inspection of the streets of Glasgow, but of course he knew the lighting of the city very well. What must have struck them was that some parts of the city appeared to be better illuminated than others. The non-technical man was apt to jump to hasty conclusions because of the effect; but Mr. Langlands, by reason of his data and historical records, would be able to show why the same light differed in results in different parts of streets and roads. It was for this reason that the collation of scientific data and records was of value. It was all very well to say that such and such a lighting committee were satisfied with the results achieved; but as lighting engineers and superintendents they wanted to know why they were satisfied.

Mr. C. H. SULLY, Director of the Electric Lamp Manufacturers' Association, agreed with what the previous speaker had said regarding the value of the paper. It was clearly pointed out in the paper that the test most in line with practical requirements was the visibility of the actual objects in the streets. To his mind this was a point they had to consider more and more. It was clear from the experiments which had been made and the data obtained that the more illumination one had on an object, the clearer was the vision, while the object itself became more apparent. The solution of the lighting problem seemed to be best met by the provision of high-power units mounted 20 or 25 ft. above the ground, and spaced at a fair distance apart. With such an equipment, distant vision was assisted. The sensitiveness of the eye was thereby materially increased because the light source did not impair the acuity of sight. It was true that when the electric light was first introduced the gas shares throughout the country fell "with a flop." The fact that such a thing happened was unfortunate not only for the gas companies, but for the electrical people. In such circumstances, the electrical people thought they had already won their battle, and as a consequence sat down at their ease. He was of opinion that they were still taking things too easily. There was room for both gas and electricity. There was much virgin soil still to be cultivated, and in this work both gas and electrical engineers could be of assistance.

Subsequent discussion revealed among the majority of those present general unanimity that Mr. Stewart's paper should be printed and made available to all those connected with public bodies or private companies who were interested in the public lighting of streets and roadways.

The PRESIDENT had no doubt the Council would take into consideration the suggestion that had been made. The Institution, he felt, would be bound to extend its usefulness if papers of such excellence and practical help were to be guaranteed in the future. Personally, he felt very proud of Mr. Stewart.

Mr. C. S. SHAPLEY (Leeds) said that, speaking as one who was interested in lighting, he could not regard Mr. Stewart's paper as the last word on the subject. A great deal still required to be done by lighting engineers and superintendents. In all his clever reasoning it seemed to him that the author had left out of account the need for the adjustment of burners and the cleanliness of lamps. He had always held to the view that, if there was a proper insistence on the adjustment of burners and a keen desire for cleanliness, then 50 p.ct. of the trouble and worry incidental to street lighting would be successfully overcome.

Mr. E. M. SEVERN, South Metropolitan Gas Company, agreed with the previous speaker on the necessity for good maintenance and thorough cleanliness.

Mr. W. MILLNER, London (British Thomson-Houston Company), reminded the members of the Institution that the paper read by Mr. Harrison raised an important and somewhat pressing question at the moment. All over the country new main roads were being constructed, and the lighting of these had to be considered. Great difficulties would probably arise; and in view of the fact that these roads crossed the boundaries of various authorities, an effort must be made to secure uniformity. Every stretch of highway must be uniformly lighted. There was no question that the distribution of gas and electricity on them would be costly, and wide spacing of units would have to be adopted, for economic reasons.

Mr. THOMAS WILKIE, Public Lighting Superintendent, Leicester, agreed with the criticism that had been made to the effect that the papers read followed too closely along the lines of electricity. In suburban areas and smaller towns gas was the illuminant that predominated. In Leicester, for example, they had only a portion of the thoroughfares electrically illuminated. He supposed the distance so covered would not exceed 1½ miles. In such circumstances it would be beneficial if they could have a discussion on how to make the best and most economical use of gas. Points relative to the size of burners and the type of burner to employ could all usefully be discussed at the conference. Glasgow was very fortunate in having a definite lighting scale to follow.

Mr. ERNEST E. SHARPE (London) emphasized the need for something being done to enable people to read the names of streets at nights. As a visitor to Glasgow he appreciated all that the city had done in this connection. The majority of other towns and cities he had visited, however, were not so far advanced as Glasgow.

Mr. F. LOFTS (London) reiterated what had been said by Messrs. Shapley and Severn as to the value of maintenance.

Mr. H. H. GRACIE (Edinburgh) spoke of the importance of lighting superintendents preparing beforehand a specification of their actual requirements. The gas industry would appreciate an innovation of that kind, and would be prepared to give it every encouragement and support. Hitherto the gas industry had always been anxious to co-operate with public lighting superintendents, and they were still ready to foster all possible improvements in public lighting.

Mr. HARRISON, discussing the lighting of highways for motorists, said the latter were at present doing the lighting of the roads for themselves. The position now was that the authorities would either have to light the roads or continue to let the motorists do it. There was no disputing the fact that the motorists had done what the road authorities would never have dared to do. They had put their light sources at 3 ft. from the ground, and of such power that everybody else was affected by them. In these circumstances the local authorities had to consider the question of placing lights at a low level, and they were in a position to do this much better than the motorists. A series of experiments had been carried out to prove the practicability of this. After various trials they had made considerable progress, but the light was still visible to pedestrians to a disagreeable extent. Three weeks ago, however, those who were experimenting with him succeeded in getting over the difficulty. As he viewed it, it was an extraordinary experience to look down a road lighted in this way. The whole of the road was flooded with light, and objects on it were clearly visible.

Mr. STEWART, replying to the discussion, said he did not regard his paper as anything like the last word in public lighting. It was merely the first. He had not stressed maintenance and good fittings because he thought these were known to be necessary by every lighting official in the country. He associated himself very strongly with the view expressed by more than one speaker—that there was abundance of room for more experimenting with regard to gas. He was pleased to hear what Mr. Gracie, of Edinburgh, had said on the question of preparing specifications. Indirectly, something of that kind was at the back of his mind when writing the paper.

Mr. H. DODIMEAD, London (Gas Light and Coke Company), in seconding a vote of thanks to the Council for the arrangements in connection with the meeting, made one or two interesting comments. In particular he indicated that he had been struck with the variety and quality of the apparatus which Mr. Langlands had at his disposal. In the south they could not hope to reach such a standard of perfection for a long time yet. It was his privilege to be in charge of the whole of the street lighting in the Gas Light and Coke Company's district. Altogether they had the control of some 44,000 lamps of various kinds. They could offer to the city authorities in London light ranging from 50 c.p. to 4000 c.p.; surely with such a choice the admission was bound to be made that gas was holding its own.

The proceedings of the general meeting afterwards terminated.

Carborundum Bricks for Steam Raising Plants.

Mentioning some of the arrangements adopted with stoking machines under boilers for the protection of refractory furnace walls and bridge walls where the burning fuel or hot clinker and ash come into intimate contact with them, Mr. C. F. Hirshfeld says that, in the case of the side walls, air cooled metal structures have been most common. Sometimes these take the form of hollow boxes through which air passes on its way to the stoker tuyères. Such boxes are frequently further protected by plates which are ribbed on the outside to catch and hold small cold particles of clinker and ash, so that the hot coal and hot clinker do not come into actual contact with the metal. In other instances cast-iron plates pierced with holes are built into the side walls so as to form the fire side of a box through which air is fed into the furnace. There are also available blocks of refractory material which can be built into bridge wall or side wall in the place of ordinary firebrick. These blocks are hollow, and are perforated on the side facing the fire. Air passes through them and into the furnace, thus keeping the blocks cool and chilling molten ash that is blown against them, so as to reduce the chances of adhesion or of fusion to the wall. Bricks made of carborundum have proved efficacious in some cases in preventing the excessive adhesion of clinker and the rapid deterioration of the wall. They are used as a facing at the so-called clinker line. Success in the use of such bricks depends to a great extent upon the binder employed to hold the carborundum crystals together, and also upon the character of the ash. At present some of the air-cooled refractory blocks referred to here are being made of carborundum for use under the most severe conditions.

North of England Gas Managers' Association.—Under the Presidency of Mr. S. Shadbolt, the autumn meeting of the Association will take place in the Co-operative Hall, South Bank, at 2.30 p.m. on Friday, Oct. 10. Mr. Shadbolt will deliver his address, and a paper is to be read by Dr. G. Weyman, of Newcastle, on "The Production of Sulphate of Ammonia." At the close of the meeting tea will be provided by the Chairman and Directors of the South Bank and Normanby Gas Light and Coke Company. Members' desiring to visit the gas-works are invited to do so before or immediately after the meeting.

INVENTION AND THE INVENTOR.

By Bertram Joy, M.I.A.E., A.M.I.Mech.E.

There are many people to whom the possibility of making money out of invention has a very strong appeal. It appears to be such an exceedingly simple method of attracting coin into one's own pocket—and this without any really hard work or the dreadful drudgery that is associated with most money-making occupations. An original idea, such as may occur to one without apparent mental effort at all, is considered to be practically as good as coin of the realm. It is only necessary to obtain protection—by applying for the grant of a patent—and thus to get a monopoly for the idea. The first manufacturer before whom the invention is presented will accept it with enthusiasm; he will, of course, pay a considerable sum in cash for the sole manufacturing and selling rights of the invention, and he will pay a royalty of so many pounds, shillings, or pence on each article turned out at his factory. Presumably such very pleasing, straightforward examples of money-making inventions have occurred, but they must be considered rather exceptional. In the greater number of cases, the inventor meets with difficulties on all sides, and sometimes has to face so much discouragement that he is apt to get the impression that every man's hand is against him.

As a matter of fact, the first to suggest any new contrivance has to face various unpleasant possibilities. The idea which seemed so novel to its inventor may prove to be not so at all; it may have been suggested, if not put into actual use, many years before. The scheme which seemed to come upon one almost as an inspiration may prove to be unworkable; though all the theory appeared to be sound, there may be no practical results to record—a most discouraging state of affairs. Perhaps the invention is good and workable, but the cost of manufacturing it turns out to be too high to command any encouraging sale to the public. It frequently happens that some invention is put before a manufacturer who will promptly refuse it without giving any reason for so doing. As a matter of fact, his reason may have nothing whatever to do with any lack of excellence or utility of the invention. Let me suggest a few. The manufacturer approached may have little spare cash to develop a new article properly; he may consider the article not suitable to work with his own particular line of business; he may think the article unsaleable—and in this case he is simply expressing an opinion which may prove to be utterly opposed to that of someone else who is approached later. No inventor, therefore, need be distressed because the first manufacturer who has the opportunity of securing the manufacturing rights of his invention fails to do so; let him rather feel that the manufacturer was incapable of visualizing the future possibilities of the invention, and, more than this, the possibility of further development of the invention. Some inventions develop in a short time to such an extent as to be almost unrecognizable.

Prizes to be Won.

In any case, the above remarks will show that difficulties have to be faced in the early stages. This fact, however, should not be sufficient to deter those so inclined from developing the inventive faculty. A well-known inventor once told the writer that he expected only to make a success of one in ten of the ideas which he thought worthy of patenting. The proportion of successful inventions for which patents have been sought is undoubtedly small, and it has been stated by an engineer of high standing that only one mechanical patent in ten thousand is worth exploiting. This certainly seems to the writer to be a very pessimistic view, and he hopes that careful investigation would make the chances of the patentee appear more hopeful. Another somewhat pessimistic remark was to the effect that it is easier to make money by gambling in stocks and shares than by exploiting patents. It must be admitted that, if regarded purely from the point of view of the gambler, the first type of gambler has the easier job—he only has to put down his money, whereas the man who interests himself in a patent has usually to go through a good deal of hard work as well. But in spite of the opinions expressed above, there are undoubtedly prizes to be won; and if, as well, we can regard the whole question from a less sordid point of view than that of mere monetary reward, then it can be stated, without any fear of contradiction, that the sudden presence of any new idea in the mind, and the subsequent mental process of developing it, provide a very pleasing and satisfying occupation. One can then pass easily into a state in which castles in the air can be built, and if these castles fall to the ground later—well, no matter. We live largely in our thoughts and ideas, and pleasurable thoughts are ever to be welcomed.

It is doubtful if the inventor of any really useful and meritorious appliance ever reaps the reward in cash to which his contribution to the convenience of the general public or of commerce should entitle him. Unfortunately there is no just relation between the value of an invention to the world at large and the cash value of it to the inventor. It can only be said that the inventor's reward depends principally upon his business knowledge and his capacity for "doing a deal." At the outset, so soon as the first idea enters the mind of the inventor, he should bring himself to realize that it is his (or somebody else's) business capacity that is going to decide the value of his invention. There are a number of men who have never received proper reward for their inventions, and there are others who have reaped benefit out of all proportion to their abilities. This state of affairs is not, of course, peculiar to the subject being discussed, but applies to many others.

What the Public Owes to Inventors.

It is a somewhat curious fact that the public generally does not in the least realize what it owes to the inventor. Who is there, for example, when seated in one of the modern luxurious high-speed expresses that travel the country from end to end, that gives one moment's thought to those who have been primarily responsible for their comfortable, rapid, and care-free journey? Who were the foremost of these people who rendered such travel possible? Watt, who made extraordinary improvements in the steam engine; Trevethick, who built the first successful railway engine; Stephenson, who improved details and produced an engine extremely efficient and speedy for its time. Add to these a host of others. One produced the injector, that wonderfully simple contrivance for throwing water into the boiler; another gave us the bogie truck, another the safety valve, another a valve gear, another a pressure gauge; while still another devised the vacuum brake, without which the high-speed travel of the present time would be impossible, because unsafe. This brilliant combination of inventors has done much to make travel possible for everyone, so that those working in our cities can have their homes in the country, and those living inland can spend a holiday at the sea. The railway, of course, is only one of the many inventions that have bestowed benefits upon thousands; how many of these thousands ever turn a grateful thought to those whose efforts gave rise to such wonderful results? This is an aspect of the large subject of invention that has always appealed to the writer, and he is glad to have an opportunity of placing it before the public for their consideration.

Improvement or Novelty?

Some inventors are, perhaps, not always well advised to turn their attention to the improvement of a class of machine or device which is at the time much in the public eye. In such cases there are sure to be many people interested in improving the device; and as a consequence there will be keen competition, many patents will be applied for, and some of them will cover the same, or nearly the same, ground. As a result, there may be no outstanding patent, and therefore nothing of real commercial value. If some more or less new line of thought is pursued, then there is always the possibility that something really novel will result; and such an idea will permit in the patent specification the drawing-up of strong claims, which, of course, have a commercial value. When a manufacturer is approached he will, if the idea brought before him appeals to his imagination, sometimes have a report drawn-up as to the novelty of the invention. The inventor is on secure ground if he knows that his idea is a really new one.

Now there is a rather unfortunate side of this question of novelty which operates against the inventor. The average business man seems to be incapable of seeing very far ahead where really novel mechanical or other improvements are concerned. Any invention which is really new is sure to possess some feature which may appear *outré*—some part with which the public will, or may, find fault. The correct way in which to view this matter would doubtless be to realize at once that the public to some extent will have to be educated. The British public will seldom accept anything "out of the rut" without a good deal of coaxing and pressing; but eventually they will accept it, sure enough.

The writer, having been associated with the automobile from its earliest days, well remembers the opposition put up by the public when motor vehicles were first run on the roads. Everyone, from the policeman down to the small street urchin, conspired to make the motorist's life a burden to him, and in the case of a breakdown the crowd which gathered round was nearly as great as that which now gathers (unfortunately) when the pedestrian falls a victim to the very machine which once provided him with amusement. Where is the opposition to the motor vehicle now? How long will it be before the main roads have to be lengthened to find room for the ever-increasing procession of motor traffic?

Once again referring to the question of novelty, and as an example of the general attitude of the public towards new appliances, let us consider what might well have happened when that very useful domestic appliance the geyser was first introduced. Presumably at that time every house would have been fitted with a kitchen range; then it would have been suggested that gas was more convenient for heating water, because hot water could be obtained almost immediately. Someone would have come along with a geyser. Then the householder would have realized that the geyser would have to be fitted on a bracket actually in the bathroom, and that it would need a flue to carry the fumes outside, and a gas pipe to carry the gas, and a water pipe to bring the water to the apparatus. All this would cost money, and where there was nothing at all in the bathroom there would now be an unsightly machine! One imagines that the householder of that period must have put up a lot of opposition to the fitting of a geyser. But that belongs to the past; the present generation accepts the geyser.

There are many similar cases, and each one serves to prove that there is always a certain amount of public education to be done in introducing any new contrivance. Let the inventor bear this in mind—and, of more importance, let the parties who co-operate with the inventor bear it in mind also. It might almost be taken for granted that, where there is nothing for the public

to find fault with or jib at, there is nothing novel, and therefore nothing really patentable.

PATENT LAW.

The inventor sometimes puts forward the complaint that, while the Patent Office are perfectly ready to take his money, they do not actually protect him. Infringers can go on infringing for the whole term of a patent, so far as the officials at the Patent Office are concerned; no one of them will take any steps to hinder such a theft—for infringing a patent can scarcely have a less harsh term applied to it. Now, as a matter of fact, the patent, which is perhaps granted after a severe tussle with the authorities, is no actual guarantee to its proprietor that he is in possession of a new invention (every invention is, or ought to be, new of course).

The supreme test is always the Law Courts. The novelty of an invention, as put forward in the specification, may hang upon the meaning applied to a word or a phrase; and naturally a legal decision is the only final and definite one. The professionally drawn-up specification seldom suffers from any fault of this description, and the skill shown by some of those responsible for describing the invention and expressing the inventor's ideas in suitable language is really remarkable.

The writer remembers to have seen on several occasions lists of articles that are supposed to be needed—"things to invent," and so on. These are intended to provide the inventor with suitable material to work on. It is very doubtful whether such suggestions are of any real use. The man with the creative mind needs not to be told what to invent, and likely enough an idea will flash upon his mind at a time when he had thought himself fully occupied with some other matter. Indeed, one feels sure that an account of the precise circumstances in which some of the great inventions were born would prove very interesting reading. One invention is known to have been first thought of during a church service; others have no doubt first occurred to the minds of their inventors in less hallowed spots.

These last remarks are not in any way intended to convey the impression that invention is an inspiration only, or that the inventor's work is finished when the first idea has impressed itself upon his mind. This is the all-too-popular notion of invention. The first suggestion is always followed by development, amendment, alteration, partial failure, some success, periods of stagnation, further ideas, more failures, totally unforeseen difficulties, and so on, until one wonders how the tide of success has ever reached high-water mark at all. Smiles, in his wonderful work "Self Help," has much to say with regard to the heroic perseverance of men responsible for some of the finest industrial inventions. It would not be politic to quote examples in an article such as this.

There are some who think that the time for great inventions of a profitable nature, and even of small ones, is approaching its end. Development takes place with such small, albeit numerous, steps, that each one of them appears to be of insufficient importance to merit patent application. A machine develops slowly but surely, and after a period of (say) ten years the machine as developed is far superior to the original; and yet this new machine embodies no outstanding patent—there is nothing for which any one man can claim a reward, though the amount of thought and skill embodied in its design and construction may have been enormous. It would almost seem that there is something not quite as it should be in the law dealing with patents; why otherwise should so much technical skill be passed over without any special recognition or encouragement? The writer's own opinion is, and always has been, that there is room for some intermediate form of protection—that is, something which would cover the ground lying between that which is rightly speaking patentable and that which is suitable only for registration. There is a great deal of clever and original design which falls between these two.

FUTURE POSSIBILITIES.

It seems unlikely that outstanding inventions will not occur in the future just as much as in the past, though it is probable that these will develop rather more slowly. Within recent years turbines have been driven by mercury vapour instead of steam. Thus while for over 200 years water has been almost exclusively employed in machines deriving their energy from the expansion of a vapour, we now have a case in which mercury is taking the place of water. The idea seems to suggest great future possibilities, and if mercury vapour ever becomes at all general it will appear a little extraordinary that such material has not previously been utilized. This example is cited merely to show the type of invention which we may expect in the future.

It is perhaps a little doubtful whether there will be many master patents in the future—by which is meant patents that cover practically the entire field in some particular manufacture or apparatus. It seems that certain patents can fairly have this term applied to them. In some other instances, if a search on the score of novelty is made among the Patent Office records, it is surprising what a number of closely similar ideas will be discovered; if in this case a patent can be secured at all, its claims will be restricted, and its money value will suffer in the same way. The writer, in the case of an invention of his own a few years back, conducted a fairly thorough search for similar appliances, and was surprised to find that the particular combination of principles embodied in the invention referred to had not apparently occurred to any other inventor. The claims were therefore made somewhat broad, and the patent may perhaps be considered a master one.

Before leaving the question of patents, which is a vast subject, and somewhat outside the scope of the present article, one curious case on the question of novelty, or the lack of it, is worth mentioning. On receiving an application for a patent, the Patent Office now make a search for novelty dating back fifty years; beyond this they do not go. In the case referred to, a very similar idea was brought to light which had been patented forty-nine years back, and as a consequence the claims for the new patent, which might have been very strong ones, had to be whittled down considerably. Had this invention been made a little later, the search would have produced no such prior patent, and therefore the specification would have contained claims of a more formidable character.

The writer hopes that he has not dwelt too much upon the negative side of invention; it is a side that certainly exists. To be forewarned is to be forearmed, so that the cautionary remarks which occur rather frequently in these notes may not be without their use. The inventor is an over-sanguine man; it is essential and right that he should be so. Had he not a large supply of faith and enthusiasm, he would add but little to the history of invention; and if he were not imbued with that strong desire to be responsible for something that had never before had existence—of combining principles in a manner in which they had never before been combined—then scientific advance would assuredly occur at a very much slower rate than it does at the present time, and humanity would be without a vast number of useful appliances and devices which it now enjoys to the utmost. It is, of course, outside the province of this article to discuss the advantages or otherwise which accrue to humanity from all this enthusiasm on the part of the inventor.

Southern Association Visit to Portsmouth.

At the invitation of the Chairman and Directors of the Portsea Island Gas Light Company, the members of the Southern Association of Gas Engineers and Managers (whose President is Mr. Leonard J. Langford, of Tunbridge Wells) will on Friday, Oct. 17, visit Portsmouth. The party will assemble at 10 o'clock in the demonstration hall at the head offices of the Company, Town Hall Square; and after the showrooms and offices have been viewed, motor coaches will convey those present to the Hilsea Gas-Works, which will be inspected under the guidance of Mr. T. Carmichael, M.Inst.Mech.E., and his staff. Members are reminded that many interesting particulars regarding the plant at Hilsea were given in papers recently read before the Association by Mr. Carmichael and Mr. Whitehead. The motor coaches for Hilsea will not leave before the arrival of the train *ex* Waterloo at 8.20 a.m. The London members travelling by this train, as well as those motoring direct to Hilsea (as those travelling by road are advised to do, timing their arrival for about 11 o'clock), will have an opportunity later in the day of inspecting the offices and showrooms. Luncheon in the Town Hall, as the guests of the Chairman and Directors of the Company, will be followed by a joint meeting, in the demonstration room already referred to, of the Eastern and Western Districts, at which, among other business, a discussion on "Meter Repairs" will be opened by Mr. S. E. Whitehead, B.Sc.Eng. At the close of the meeting, members who so desire will be conveyed to the Company's meter and stove shops at Kudmore, where the methods of repairing both meters and stoves will be seen in operation. During the business meeting, arrangements have been made to entertain the ladies by a tour of H.M. Dockyard, H.M.S. "Victory," and Naval Establishments. Tea in the Company's chief offices will bring to a close what holds out every promise of being a thoroughly enjoyable day. The Directors have kindly extended their invitation to the luncheon, visit to Hilsea, and tea, to the ladies.

One Meter for Apartment Houses.

One gas-meter for an apartment or business building, and the gas bill to be paid by the landlord, is, says the "Gas Age-Record," the latest innovation in gas service announced by the Consolidated Gas Company of New York. Under the new arrangement, one meter will take the place of scores or hundreds in several buildings of this character now being erected, and the agent or owner will pay for the gas supplied to the original tenants, as is the case with water and other services. There are many arguments advanced in favour of the one meter service. For one thing, the owner of the building saves on the cost of piping. A fifteen-storey building with six apartments on a floor, including laundries, public lighting, and janitor's apartment, would mean, on the old plan, the installation of more than ninety gas risers, and considerably more piping for connections and branch lines. Piping for one meter in the building would require only three, or at the most six, risers. Other advantages are that the tenant does not have to make a personal application to the gas company for service, and there is no necessity for the payment of individual deposits. Among the largest apartment buildings in New York to have the master meter service will be one with sixty-five individual apartments, and in this particular case the landlord will have to pay one gas bill for the tenants in all his sixty-five apartments. The gas service will be included in the rent, of course, and the landlord will know fairly accurately how much gas his tenants are likely to use over a year.

Mr. Walter A. Sapey, Engineer and Secretary of the Tamworth Gas Light and Coke Company, who died at the age of 57, left estate of the gross value of £6198, with net personalty £4711.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Gas-Works and Electricity Supply.

SIR,—The Labour Party are including in their programme measures for a national system of electricity supply, based upon super-power stations and a vast network of transmission cables. Coupled with these laudable efforts for a cheap and abundant supply of electricity, and of equal importance, is the conservation of coal and the production of oil, &c. During the war it was stated that the shortage of oil and petrol nearly resulted in disaster, and it is therefore clearly the duty of the Government to secure the country from a repetition of such a risk.

Gas undertakings are favourably placed to assist in this vast scheme of electricity supply. Gas-works are established throughout the country, the organization exists, fuel in the shape of gas or coke is available, and also the plant for the recovery of the bye-products.

Mr. A. Hugh Seabrook's suggestion of utilizing the gas-works for generating current and feeding into the transmission cables, opens-up a field of considerable interest to the gas industry. Sir Dugald Clerk has pointed out that "one B.H.P. hour can be developed in gas engines with a consumption of only 8500 B.Th.U." Sir C. Parsons gives as his best test 15,000 B.Th.U. Nevertheless, for various reasons, large electric power stations are usually driven by steam, without regard to the preservation of the bye-products from the coal. Transmission losses of electricity from distant power stations are stated to be from 12 to 20 p.ct.

It is not suggested that gas undertakings could supply the whole of the electricity required, but where lengthy transmission lines are involved, and in rural districts, the gas-works are favourably placed to generate current by means of gas engines of economical size, and to supply electric energy to the transmission cables. It is acknowledged that gas engines have an economic limit as to size, and that it would not be possible to build them in units of sufficient capacity to meet the requirements of a big power station; but with gas engine generating stations in a number of small units at the various gas-works, and the existing arrangements as regards organization, fuel, bye-product recovery, and saving of capital and transmission losses, the gas undertaking starts with a distinct initial asset.

W. CHANEY.

146, *Bishopsgate, London, E.C.* 2, *Sept.* 27, 1924.

A Gas-Works "Development" Promotion.

SIR,—Your editorial under the above heading relating to the Gas-Works Development and Guarantee Corporation, Ltd., and the Western Counties Incorporated Trust, Ltd., has been sent to me, and as the name of "Kingdon" appears, and I have recently removed to Devonshire (one of the Western Counties), I have received inquiries respecting myself. I might mention that I am not in any way associated with either concern; and although I have been connected with the gas industry for over thirty years, I have not before heard the name of Mr. Ivor C. Kingdon in the gas profession, and he is quite unknown to me.

Your editorial reminds me that years ago I was offered a gas undertaking for £800, but as the same, in my opinion, was too small to turn into a profitable concern, I did not entertain the proposal. This particular undertaking was soon afterwards sold, and a prospectus issued from an office in the neighbourhood of Cannon Street, London, inviting applications for £30,000, about one-half of which was to be paid to the promoters for the same undertaking. The balance was for extensions to smaller villages.

Since this, other gas-work promotions have been dealt with on similar lines, from addresses in London, Mr. Editor, well known to you, at the expense of unfortunate investors who had been gulled by a prospectus, as you state, "too forcibly tempting."

Rosemount, Preston, Paignton, S. Devon, Sept. 26, 1924.

ALFRED J. KINGDON.

REGISTER OF PATENTS.

Gasholders.—No. 210,724.

MASCHINENFABRIK AUGSBURG NURNBERG, A. G., of Nürnberg.

No. 15,533; June 14, 1923. Convention date, Feb. 5, 1923.

The small weight of tankless gasholders which is theoretically possible is limited in practice by the necessity of providing for the requisite stiffening of the holder shell and also its disc—on the one hand for withstanding the pressure of the wind, the weight of snow, &c., and on the other hand for withstanding the pressure of the enclosed gas. The present invention has for its object an improved disc gasholder wherein a particularly effective stiffening against radial and axial strains is provided by the fact that the holder is stiffened at the top by an annular or disc-shaped stiffening device which encloses solid angles with the vertical surfaces of the holder shell. The device may be made either as a solid body from flat sheet metal or in the form of lattice work. The patentees claim that the rigidity attained is so great that, for example, metal sheeting having a thickness of only 4 mm. is strong enough for a disc gasholder of 70 m. high by 50 m. diameter, so that a large saving of material and cost is achieved.

Gas Manufacture.—No. 220,676.

NIELSEN, H., of Muswell Hill, and LAING, B., of Hatfield.

No. 8107; March 21, 1923.

This invention relates to gas manufacture, especially gas produced by so-called complete gasification methods, the chief object of the invention being to cheapen the production and improve the quality of a gas suitable for use as ordinary town gas or for domestic purposes.

According to the invention, and in distillation processes in which water gas is passed through a retort in which carbonaceous material is undergoing treatment, an increased yield of gas is obtained by utilizing the blow gas formed during water gas production. Coal is distilled within a retort by utilizing the sensible heat of the water gas produced from the carbonaceous residue resulting from the retorting process. The producer from which the water gas is obtained is run in such a way during the blow period that the resulting blow gas, instead of consisting mainly of carbon dioxide and nitrogen, which are inert gases, resembles ordinary producer gas. The blow gas obtained in this manner is of a reducing nature, and can be utilized in the manufacture of hydrogen on a large scale simultaneously with the carrying-on of the retorting process, by passing the blow gas through a container packed with iron ore, or, preferably, lumps of iron oxide, under suitable high-temperature conditions. The gas being of a reducing nature, the iron oxide is reduced to a metallic state. The blow gas is thereupon cut off, and superheated steam blown through the incandescent metallic iron. Dissociation of the steam takes place, the oxygen at the same time combining with the metallic iron, thereby forming iron oxide, while the hydrogen is set free. The iron oxide is thereafter again reduced to the metallic state by cutting off the supply of steam and admitting a further supply of blow gas, and so on. The superheating of the steam may be effected by placing one or more sets each comprising two alternately worked chequer-work brick chambers above the container; secondary air being added to the residual blow gas which has already been used for reduction purposes in the container, and the mixture admitted and burnt alternately in the chequer-work brick chambers while the residual gas is still hot, so as to utilize any combustible constituents which are still contained in the residual blow gas.

Owing to this arrangement, the chequer-work brick chambers may be heated up to a temperature suitable for superheating the steam subsequently employed in the container. The hydrogen which is thus set free is admixed with the combined retort and water gas, preferably after the condensible hydrocarbons have been extracted. As a result a very much larger volume of mixed gas is produced containing a lower percentage of carbon dioxide.

During ordinary working, the mixed gas obtained per ton of raw bituminous coal, according to the present invention, is approximately as follows: (*a*) 5000 c.ft. of rich distillation gas from the primary distillation of the raw coal. This gas will contain on the average from 6 p.ct. to 8 p.ct. of carbon monoxide. (*b*) 34,000 c.ft. of water gas produced in the water gas producers from the resultant semi-coke or carbonaceous residue, and containing about 42 p.ct. of carbon monoxide. (*c*) 14,000 c.ft. of hydrogen gas, containing no carbon monoxide, by utilizing the reducing properties of the blow gas. The total quantity of saleable gas produced per ton of raw coal will thus be 53,000 c.ft., containing about 25 p.ct. to 27 p.ct. of carbon monoxide or even less, as against 40 p.ct. to 45 p.ct. generally obtained by the usual complete gasification process.

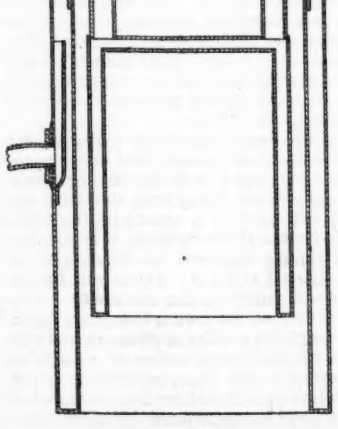
It will be clear that blow gas, which is usually wasted, is utilized to produce a large volume of hydrogen, which will form a remunerative addition to town gas works, and at the same time the percentage of carbon monoxide in the mixed gas is almost halved. The hydrogen may also be purified and sold as such, or the whole or part of the hydrogen may be employed for other purposes.

Geysers.—No. 220,754.

FILDES, T. R., of Manchester.

No. 15,683; June 16, 1923.

The object of this invention is to provide a geyser which may be more readily dismantled for cleaning, and which has fewer joints requiring to be kept water-tight. The geyser comprises a hollow-walled cylinder, the inner cylinder wall being connected to the outer cylinder wall at the bottom and extending about five-sixths of the wall up. Located in this cylinder is a second hollow-walled cylinder composed of two inverted closed cylindrical vessels connected together at their bottom edges so as to produce a cavity between the side walls and at the top. The second cylinder is carried by means of connecting pipes from a tray-like member resting on the top of the first inner cylinder wall; a depending rim or flange thereon forming a tight fit for the top edge of the inner cylinder wall, and an upturned rim flange being provided over which the heated water flows. Usually two connecting pipes are provided at diametrically opposite points, one leading up from the top of the inner cylindrical boiler to the tray, while the



An Improved Geyser.

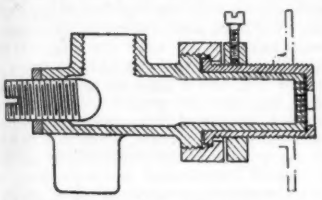
other is provided with a funnel-like top extending above the level of the liquid in the tray and forming the inlet pipe for the cold water leading into the inner boiler on the side opposite to the outlet. The tray is formed with a central flue leading from the under side thereof and extending through a domed top or cover removably attached to the top edge of the outer wall of the first-mentioned hollow-walled cylinder. The draw-off pipe is provided at a point about half-way down the outer casing leading from a pocket designed to prevent water being drawn-off from a level below the top of the boiler. A funnel-shaped water inlet arranged in the domed top leads to the boiler inlet. The boiler extends nearly to the bottom of the outer cylinder, and the burner is located in or below the boiler; the products of combustion escaping *via* the space between the boiler and the outer cylinder to the flue.

Injectors for Gas-Fires.—No. 220,831.

BROWN, J., of Falkirk.

No. 24,092; Sept. 27, 1923.

This invention relates to an injector of the type including a nozzle having jet orifices arranged in radial clusters and controllable by a rotatable apertured shutter of the hit-and-miss type. The invention aims to provide readily accessible external controlling means.



A Forth & Clyde & Sunnyside Injector.

As will be seen from the drawing, the shutter is formed as a thimble-like cap applied externally to the nozzle, the outer end of the cap having a suitably shaped aperture and being adapted to co operate with the orificed end of the nozzle. The cap is formed near its inner end with an external shoulder engageable by an internal ledge on an internally screw-threaded ring, so that by adjustment of the ring the cap may be set with its outer end close against the nozzle. A set-screw is provided, to maintain a given setting of the injector—that is, a certain exposure of jet orifices.

Screening Apparatus.—No. 221,095.

STRACHAN & HENSHAW, LTD., SARGENT, T., GROSSMITH, G. W., and BEASLEY, H. H., all of Bristol.

No. 24,616; Oct. 3, 1923.

This invention relates to apparatus for screening, sifting, or grading materials, and is particularly applicable for screening a friable material such as gas-works coke. Apparatus according to the present invention comprises a plurality of bars, forming a conveyor, driving means and guiding means whereby the bars are caused to travel in a direction transverse to their length in a path which is horizontal or slightly inclined, preferably upwards, a device whereby material is fed from above on to one end of the conveyor, and devices fixed above the conveyor which serve to disturb and delay the material as it passes along. Preferably, the bars constituting the conveyor are spaced widely; and a series of screens or sieves, of which the sizes of the meshes increase progressively, is provided immediately below the conveyor. Where only two degrees of grading of the material (and hence only one grade of screen) are required, the conveyor itself may be of close mesh and may itself act as a screen, and the screens or sieves fixed immediately under it may be modified or dispensed with.

A trough, the bottom of which is so constructed that it forms a sieve or series of sieves, which may consist of longitudinal or cross bars of any suitable cross-section; these bars being placed at any distance from each other, so as to provide spaces, between the bars, through which the material to be screened from the main bulk passes. The trough may be inclined at any suitable angle, so that the main bulk of the material is delivered at any requisite altitude above the loading level. For conveying the coke up the trough and over the sieves, a series of carrier bars of suitable cross-section is employed; the arrangement being such that there is no tendency of the carrier bars to ride over or dig into the material.

The carrier bars are attached at required distances apart to endless chains, which, when driven by suitable mechanism, cause the bars to travel the whole length of the screening shoot.

For the purpose of assisting the process of grading the material passing over the trough, the patentees provide a disturbing device or devices whereby the speed of travel of the coke is retarded relative to that of the carrier bars; the latter being caused to pass under a portion of the material, thereby imparting a gentle sifting motion.

The accompanying drawing is a plan of the apparatus.

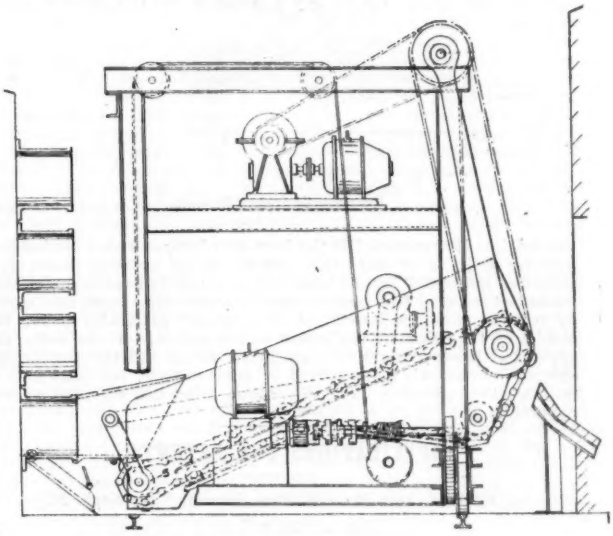
Removing Coke from Retorts.—No. 221,024.

RIDE AND BELL, LTD., of Misterton, and BELL, G., of Retford.

No. 15,588; June 15, 1923.

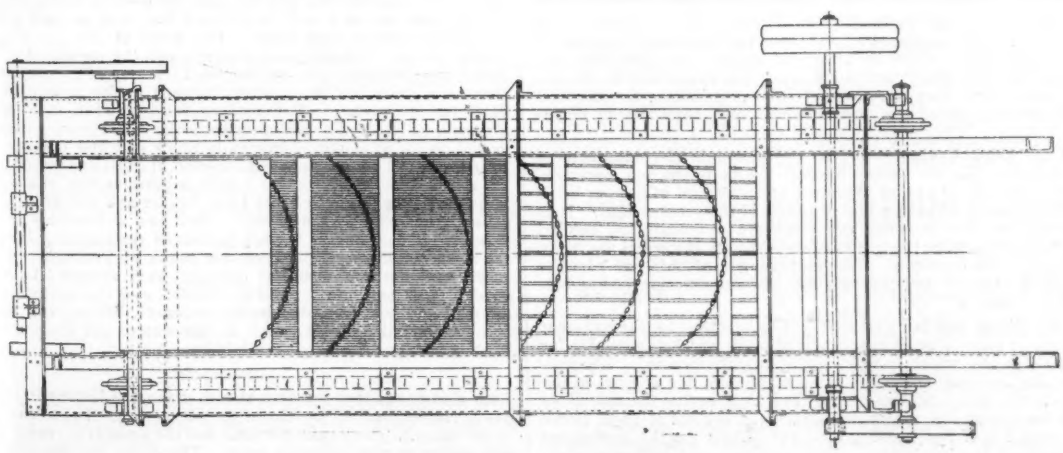
This invention relates to apparatus for removing coke from a battery of superimposed series of retorts of the type in which the coke is discharged from one of the retorts on to a conveyor carried by the apparatus which is movable on rails parallel to the battery; the conveyor being designed to be raised or lowered to the various retort levels, and to deliver the coke on to a quenching hearth, whence it is removed in suitable skips or wagons. The object of the invention is to provide an improved construction and operation of the means for receiving the coke from the different tiers of retorts and depositing it at the desired place.

A main frame is provided, and the conveyor is in the form of an endless band around drums or rollers, which are mounted at each end of a framework of channel formation, one end of which engages substantially vertical guides on the main frame. A chain or cable supports the guided end of the conveyor framework, and link suspension is provided from the main frame pivoted to the axis of the drum at the other end of the framework to support this end; the conveyor being driven by chain gear comprising chain wheels co-axial with the link pivots. The apparatus may be fitted with means for reversing the motion of the conveyor, in order that it may be used to feed coke or other fuel to furnaces. A movable chute, nozzle, or other bridging device is journalled between arms pivoted to the guided end of the conveyor framework; and a link connects the arms to suitable adjusting mechanism, which may comprise an arm on a shaft or spindle provided with means such as worm gear for being rotated.



Apparatus for Removing Coke.

The main frame may be mounted on wheels, and provided with a motor to move the apparatus or to raise and lower the coke container. Two clutch members may be provided rotatable on a shaft driven by the motor, and geared respectively to the travelling wheels and to a winding drum carrying the cable by which the guided end of the conveyor framework is adjusted. A movable clutch member is keyed to the shaft and is capable of engaging either of the other clutch members. The illustration shows a sectional elevation of the apparatus.



Coke Screening Apparatus.

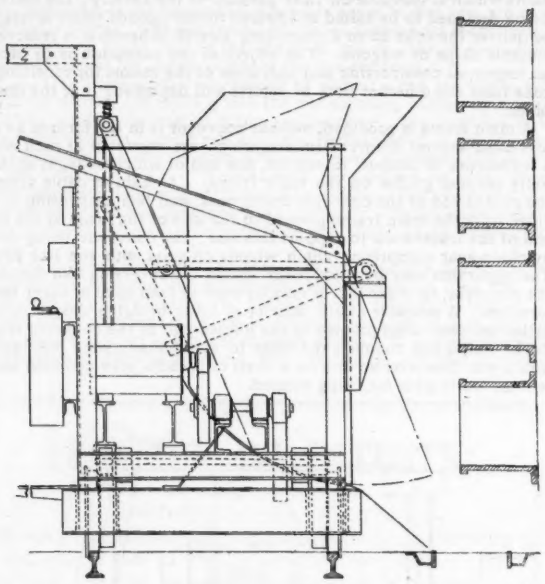
Furnace-Charging Device for Horizontal Settings.

No. 221,114.

Croft, C. M., of Putney, and Buxton, R. H., of Wandsworth.

No. 28,041; Nov. 7, 1923.

This invention relates to means for charging the furnaces of horizontal coal-carbonizing settings, in which the hot coke from the retorts is transferred to the furnaces. A receiver, mounted upon a travelling chassis or carriage to take the coke as discharged from the retorts, is displaceable upon the chassis in such a manner that its upper end can be brought towards or under the retort to be discharged, and by a contrary movement its opposite end can be brought towards or over the mouth of a furnace into which the charge is to be delivered. Preferably



Furnace Charging Device.

the receiver is constructed in the form of a hopper with a discharging aperture at its lower end; this aperture being normally closed by a curved or tangential bottom plate which is rigidly fixed to the chassis frame or the like. The receiver may be displaceable upon the chassis by rotation around a horizontal axis, located preferably about the middle of the height of the hopper and to one side of the same, the upper and lower portions with the filling mouth and the discharging aperture respectively being curved or offset towards the same side to facilitate the operation. The illustration is an end elevation of the apparatus.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for Sept. 24.]

Nos. 21,689 to 22,262.

Bourdon, A. V. A.—"Kitchen gas range." No. 22,126.
Compagnie pour la Fabrication des Compteurs et Matériel d'Usines à Gaz.—"Gas-meters." No. 21,990.
Deckers, J. F.—"Gas-distributing apparatus." No. 21,909.
Koppers Co.—"Purification of fuel gas." No. 21,739.
Owens, J. S.—"Grate for burning coke, &c." No. 21,865.
Pachen, F.—"Gas-producers." No. 22 154.
Parker, C. H.—"Distillation of coal, &c." No. 21,910.
Rude, J.—"Production of water-gas from fuel, &c." No. 21,695.
Wheeler, H. J.—"Geysers, &c." No. 21,690.

Street Lighting at Retford.—The Retford Town Council, at a meeting last Friday, approved of a scheme for the better lighting of the town this winter. Alderman Peatfield explained that the Gas Committee had received many complaints about the badly lighted streets, but he pointed out that the Council were responsible, as they had adopted the cheaper of the two schemes previously placed before them.

Gas for Brick Baking.—Out in Chicago a brick manufacturer uses nothing but gas for baking bricks. To burn 400,000 bricks requires 800,000 c.ft. of gas, or about the same amount of gas per brick as would be needed to bake a loaf of bread of the same weight. It is claimed that in this gas-fired kiln there are practically no spoiled bricks. Three days after the gas has been shut off, the bricks are ready for delivery to the customer. The daily output of this one plant is about 300,000 bricks, and the monthly gas consumption is approximately 7,500,000 c.ft.

Bexhill Water and Gas Company.—The accounts for the half-year ended June 30 show a balance at credit of profit and loss available for dividend of £12,063, which includes £7683 brought forward. The dividends for the half-year are at the rates of 7½ p.ct. per annum on the capital authorized by the Acts of 1885 and 1892, and at the rate of 5½ p.ct. per annum on the capital authorized by the Act of 1896, Order of 1901, and Act of 1904, and 5 p.ct. per annum on the preference share capital, all less income-tax. This, with provision for income-tax, will leave £6982 to be carried forward to the next account.

MISCELLANEOUS NEWS.

BRITISH GAS LIGHT COMPANY, LTD.

The Annual General Meeting of the Company was held on Wednesday last, at the London Offices, No. 2, The Abbey Garden, Westminster—Mr. Henry Woodall in the chair.

The Secretary (Mr. A. W. Brookes) read the Auditors' reports, and the report of the Directors and the statement of accounts for the year ended June 30 were taken as read.

The Chairman, on rising to move the adoption of the report and accounts, said: In the first place, I should like to say how very sorry the Directors are, and I am sure you will be, that Mr. Abbey-Williams, one of my colleagues, is unable to be present owing to illness He will regret very much not being with us.

THE COMPANY'S CENTENARY.

My colleagues and I are proud to meet you to-day. As you know, this is our centenary, and after a history of one hundred years we are able to present to you a report which shows that the position of the Company is as sound as it ever was. We have every reason to be grateful, first to the many able men who have looked after the affairs of the Company in the past, and also that we have been able to carry on successfully. On an occasion like this, one is tempted to mention the many to whom we are indebted, but I do not propose to do so now. A short history of the Company is in course of preparation, and before the end of the year we hope to send you all a copy, when you will be able to read at your leisure of the growth of the undertaking and the names of those who have so largely contributed to its success. In celebration of the centenary we entertained the whole of the employees of the stations, together with their wives, at the British Empire Exhibition at Wembley, in July last. In order that every employee should have the opportunity of taking part in the celebration, three excursions were arranged; the Company providing return railway fares, free admission to the exhibition, and two good meals. Each employee was also given a money present. The greatest satisfaction was expressed by representatives of the employees at the entertainment and the arrangements made for their comfort and enjoyment, which were most admirably carried out by our chief officers. I am sure that these gatherings have had a good effect, and the men realize the fact that the part they have played in the history of the Company has not been forgotten. When we met the men at the luncheons at Wembley, I told them that we intended to mark the centenary permanently by the formation of a pension fund which would take effect in 1925. The details and rules to govern this pension fund are not yet quite decided upon, but the work is well in hand. With our somewhat unusual constitution, any departure from the existing order of things is a little complicated, and this year has been a very busy one for our officials; but when we meet you again, we shall be able to tell you that a pension fund is in operation, and I hope you will agree that we could mark our centenary in no better way.

THE REPORT AND ACCOUNTS.

Now we turn to the report and accounts. Last year we had a decrease in our business of 3·24 p.ct.; this year we have the pleasure of announcing an increase of 6¾ p.ct. Nearly all gas undertakings are increasing their business, and it is largely due to the admirable way in which the uses of gas have been brought before the public, and the improvement in all kinds of gas apparatus for their use and convenience. People are no longer satisfied with solid fuel, when they find gaseous fuel so much more convenient and easy to control. That this is being recognized more day by day, makes for the security and stability of the industry and of our undertaking.

HULL.

The price of gas at Hull was reduced to 8d. per therm on Oct. 1 last year, and I mentioned at the general meeting that we hoped to do better later. I am pleased to report that further reductions have been made, and that since April 1 this year the price charged has been only 7d. per therm. (A reduction of 1d. per therm at Hull equals £31,726 per annum.) Furthermore, we have been able to reduce the price of gas supplied in bulk to the Hull Corporation to 6d. per therm as from the same date. The result of the reductions in price has been that, although we sold 127 million c.ft. more gas in the year to June, 1924, than in 1923, the receipts for gas rental were £30,733 less. The profit for the year to June, 1924—viz., £64,338—can therefore be regarded as a very satisfactory one, as it is only £14,650 less than in the year to June, 1923. The profit of £64,338 is £20,484 in excess of the Parliamentary interest, and the surplus has been disposed of as follows: £13,597 has been transferred to the Hull reserve fund, and £6887 has been carried forward to the revenue account of Hull for next year. The reserve fund at Hull now amounts to £70,500, which is the maximum authorized by Parliament, and is invested partly in 3½ p.ct. Conversion Stock and the balance in 5 p.ct. War Stock. The war memorial erected at Hull was unveiled on Dec. 18, 1923. The ceremony was a most impressive one, and there was a large gathering, including the Lord Mayor and the Town Clerk, and other representative gentlemen. The new showrooms at Hull are practically completed. A large portion of the building is in use, and the more commodious premises are much appreciated. The showrooms and the war memorial building were designed by the distinguished Architect, Mr. P. Morley Horder, and the sculpture work on the memorial was executed by Mr. Allan G. Wyon, who some years ago designed the medal which we present to our long-service men. Both buildings have been greatly admired.

NORWICH.

I am glad to say that we were able to make a reduction in the price of gas at Norwich of 1d. per therm on Jan. 1, 1924. The sales of gas were 29 million c.ft. more than last year, but the amount of rental was £7400 less, owing to reductions in price. The profit for the year to June, 1924, amounted to £40,493, which is only £775 less than the parlia-

mentary interest. This is highly satisfactory, as there were exceptional charges against revenue during that year amounting to £15,000. In 1923 the profit was only £24,782, but in that year the exceptional charges amounted to £26,000. I referred last year to the large expenditure on alterations and extensions at the Palace Works—viz., £236,159—and mentioned that a considerable portion of this sum would be chargeable against revenue. This latter amounted to £80,415. Of this sum, £65,000 has now been disposed of, and there remains only £15,415 to be charged against the revenue of the station, as soon as circumstances will permit. Last year I told you we had extended our main to Wroxham. This extension is justifying itself, and we are now continuing the Wroxham main to Coltishall. As you know, a large part of our area is still without a gas supply, and we intend extending from time to time to the various outlying villages.

TROWBRIDGE.

At Trowbridge, we sold 2½ million c.ft. more gas than in 1923, but the gas rental, owing to reduced prices, amounted to £1860 less. The profit of £5309, although £2279 less than in 1923, is satisfactory, especially when it is borne in mind that a considerable expenditure on carbonizing plant was incurred in 1924. As it is, the profit is only £380 less than the authorized interest. The new showroom was opened on May 15, and good business has resulted. It is an attractive little place in the centre of the town, and I am sure will do us much good.

HOLYWELL.

Our smallest station at Holywell continues to do well, and the profit shows a slight increase.

YARMOUTH.

Our tar works at Yarmouth did very well, and made a larger profit by nearly £2000 than in 1923.

SWANAGE.

At Swanage, in which concern we have a large interest, the new works, both gas and electricity, are nearing completion. We shall now have an opportunity of pushing the business, which hitherto we have been unable to do, owing to the inadequate capacity of the old plant.

NET PROFIT AND CARRY-FORWARD.

The total profit for the year was £118,250, against £115,427 last year. After providing for interest on debentures and debenture stock and income-tax, the net profit amounted to £50,911, as against £48,184 last year. After paying the year's dividend on the 7 p.ct. cumulative preference stock and a dividend of 7½ p.ct. on the ordinary stock, there will be a balance of £46,929 to carry forward. The carry-forward is decreased in round figures by £6000, but we have added to our Hull reserve £13,597 and have met exceptional charges of £22,000, so that the results generally may be regarded as highly satisfactory.

GENERAL.

With regard to the new Memorandum, the Company's petition was heard by Mr. Justice Eve on April 15, when an order confirming the substitution of the new Memorandum and Articles of Association for the Deed of Settlement was made. One of the things this enabled us to do was to invest money in electricity and water, and therefore we are now in a position to invest money at Swanage in the electricity undertaking. That was one of the chief reasons why we had to have the Memorandum altered. The conversion of shares to stock has been carried out in accordance with the extraordinary resolution passed at the extraordinary general meeting which was held immediately after the annual general meeting last year. A slip containing an explanation of the rate of dividend was sent out with the interim dividend paid in April, and a similar slip will be circularized with the final dividend paid next month. No more of these notices will be issued, but we felt that this one would make the position quite clear to some of our stockholders who might be a little confused as to the actual return they are obtaining upon their investment. In conclusion, I am happy to inform you that all our stations are in good order, and that during the year at all of them improvements have been made. The results obtained have been excellent, and reflect great credit on all concerned. A hundred years ago the undertaking was started by men of wisdom and sound judgment, and it has had a life of uninterrupted success. Service with the Company always has been, and still is, sought after, and we have attracted the best of officers and men. We are watching our younger men, and doing what we can to encourage them; and I think there is little doubt that they will in due time be fully able to take up the work as their elders lay it down, and carry on the traditions of honest dealing and sound finance which have always characterized this Company.

Mr. FREDERICK WILKIN formally seconded the motion for the adoption of the report and accounts, and it was unanimously carried without discussion.

THE DIVIDEND.

The CHAIRMAN next proposed that the payment by the Directors of the dividend at the rate of 7 p.ct. per annum on the cumulative preference stock of the Company be confirmed.

Mr. WILKIN seconded this, and it was agreed to.

The CHAIRMAN moved that the payment by the Directors of the interim dividend at the rate of 3½ p.ct. on the ordinary stock, as mentioned in their report of Sept. 8, be confirmed, and that a final dividend on the ordinary stock, at the rate of 4 p.ct., less income-tax, making 7½ p.ct. for the year, be now declared, the same to be payable on Oct. 3.

Mr. WILKIN seconded the resolution, and it was unanimously passed.

RE-ELECTIONS.

The CHAIRMAN said he now had a very pleasant duty to perform, and that was to propose the re-election as a Director of Major-General W. T. Corrie. He had been on the Board for thirty years, and they all wished him to remain there.

Mr. HENRY PULLMAN, J.P., in seconding the motion, congratulated the proprietors on having the services of so valuable a member of the Board as the gentleman whose re-election was now before the meeting.

The motion was carried.

Major-General CORRIE, in acknowledgment, said the Board had an excellent pilot in his friend Mr. Woodall, who was always most ready to place every information on the affairs of the Company at the disposal of his colleagues.

The CHAIRMAN then proposed the re-election as a Director of Mr. Henry Pullman, who, he remarked, had not been with them so long as Major-General Corrie, but they hoped in course of time he also might be able to say that he had served for thirty years on the Board. As they were all aware, Mr. Pullman had had large experience of the administration of gas and other undertakings, and he was a most useful colleague.

The resolution was seconded by Mr. HAROLD G. PALMER (Deputy-Chairman), and passed by the meeting.

Mr. PULLMAN said he hoped to continue not only to retain, but to merit the confidence of the proprietors.

The Auditors (Mr. E. Knowles Corrie and Mr. William Cash, F.C.A.) were re-appointed, on the motion of Lieut.-Colonel W. F. T. CORRIE, seconded by Mr. KENNETH R. MACKAY.

VOTES OF THANKS.

Mr. F. R. W. SLY, in proposing that the best thanks of the meeting be given to the Chairman and Directors for the able manner in which they had carried on the affairs of the Company, said he need only mention two points in justification of this. These were the tangible 7½ p.ct. dividend on the ordinary stock, and the fact that there were only thirteen or fourteen proprietors present representing the £2,000,000 of capital which the Board controlled.

Mr. C. A. MORGAN seconded the motion, and it was heartily agreed to.

The CHAIRMAN, acknowledging the vote, said it was a pleasure to work for a Company who had such a willing, loyal, and capable staff. The Directors had given the proprietors a report with which they could be reasonably satisfied; and the prospects of the Company appeared to him to be bright, because he was one of those who believed very strongly in the future of gas. Proceeding, he proposed that the thanks of the meeting be given to the Secretary, officers, staffs, and workmen of the Company. As he had already shown them, the Board realized that they had to take a long view, and they were watching their younger men, who were being trained under the older ones, so that they might be able to take their places and carry on when the necessity arose—he hoped far in the future. The British Gas Light Company seemed to be a healthy one to work with, for they had presented the long-service medal (for over twenty-five years' service) already to 350 officers and men. The great instance of longevity in this Company was his revered friend Mr. Wilkin, whose father was a Director when the Company started a hundred years ago, and served the undertaking for fifty years. His son had now served it for practically the same period. He thought this was probably a unique record. Right away down every one associated with the Company seemed to thrive. The Board felt very grateful indeed to their officers and workmen. They tried to make the service attractive to them, and he believed they succeeded. The pension fund, he believed, would be of great assistance in this direction. At the present time pensions were awarded, but there was no certainty about them; everything was at the pleasure of the Board. Workmen to-day realized more than formerly the necessity of providing for old age, and if this could be done with the help of the Company, men would regard the service as even more satisfactory than was the case now. The Board could not, as they would like to do, have a co-partnership scheme, because of the constitution of the Company. He hoped, however, that the pension scheme would prove to be of a very attractive character. Co-partnership cost a good deal of money, and if they were not to be burdened with this cost they could afford to be generous, as he was sure the proprietors would wish the Board to be, in regard to the pension fund. As to the officers, the only one present that day was Mr. Brookes. They all knew how well Mr. Brookes looked after the interests of the Company. He had been with them 46 years, and had a very fine record. ["Hear, hear."] The Board congratulated themselves very much on having such a man to resort to, for he knew the history and details of the Company in all their ramifications. The engineers were distinguished in their profession, and in every direction the Company were admirably served.

Mr. PALMER seconded the vote, which was cordially endorsed by those present.

Mr. BROOKES remarked that it was a very great pleasure to him to acknowledge the vote, and it would be a further pleasure to convey it to those concerned, for this expression of appreciation of services rendered was welcomed by all. He was sure it would be the wish of the engineers, as it was his own, that he should take this opportunity of testifying to the help received from their assistants and staffs. All did their work willingly and well.

Cookery Demonstrations at Spenborough.—Under the auspices of the Spenborough Gas Department a series of free cookery demonstrations and lectures is to be given by Miss E. Sanderson, of Birmingham, at the Cleckheaton Town Hall, the Heckmondwike United Methodist Free Church School, the Birkenshaw Wesleyan School, and the Gomersal Mechanics' Institute, every afternoon and evening for a week at the first two places, and for three days at the last two, commencing Oct. 6.

Inquiry at Marsden.—Mr. A. W. Brightmore, Inspector for the Ministry of Health, held an inquiry at Marsden, on Sept. 25, into the District Council's application to borrow £7000 for a new gasholder. Mr. H. Greenwood, Clerk to the Council, said the total debt, including £27,765 on the housing scheme, was £31,215, and the rates were 11s. in the pound. Mr. J. E. Buckley, Gas Engineer and Manager, said the undertaking was purchased from the Marsden Gas Company in 1886 for £5000, which was repaid by 1906. The annual make of gas in 1906 was 27,000,000 c.ft., and there were then 808 consumers. To March, 1924, the annual make was 42,000,000 c.ft., and there were 1246 consumers. This year there were fifty new consumers and 127 new cookers; but there had been no addition to the storage capacity. The proposed holder would be of 200,000 c.ft. capacity. The maximum permissible charge was 5s. 6d. per 1000 c.ft., and the nearest approach in practice was 4s. 9d. in 1922. The present price was 3s. 4d. There was no opposition to the application.

GAS REGULATION ACT APPLICATIONS.

There has appeared in the "London Gazette" the following further notice regarding an application to the Board of Trade under the Gas Regulation Act.

SPECIAL ORDER.

Altrincham Gas Company.

The Company intend to apply to the Board of Trade for an Order under section 10, to empower them to work the tramway, tramroad, or lines of rails authorized by the Altrincham Gas Act, 1893, by any mechanical power not being electrical power; to make new provision enabling them to prescribe the nature, size, and materials of pipes and fittings on consumers' premises; and for general purposes.

ALLOA CORPORATION GAS DEPARTMENT.

The accounts and statistics of working of the Alloa Corporation Gas Department for the year ended May 15 last were submitted to a recent meeting of the Town Council by the Convener (Bailie Hendry).

The sum paid for coal was £15,942, and the receipts for residuals £14,200, equal to 89 p.ct. of the cost of coal—52 p.ct. from coke, 29 p.ct. from tar, and 8 p.ct. from sulphate of ammonia. The cost for coal was equal to 20·06d. per 1000 c.ft. of gas sold, and the income from residuals 17·87d., making the cost for coal less residuals 2·19d. per 1000 c.ft. sold. The gas sold showed an increase of almost 13 million c.ft. The total income was £46,728, which includes £2700 approximately as the sum paid by gas consumers during six months of the year at an increased rate of 7d. per 1000 c.ft. to meet electricity losses. The expenditure amounted to £30,445; there being a gross profit of £16,283 to meet capital charges of interest and sinking fund of £6146, leaving a net profit of £10,137. A sum of £5000 was directed to be handed to the Electricity Department towards payment of the accumulated loss of £38,000 in the working of that Department. The capital debt of the gas undertaking is equal to £265 per million c.ft., or 5s. 3·57d. per 1000 c.ft. of gas made. Capital charges were 6·78d. per 1000 c.ft. made. The working results gave 18,006 c.ft. of gas made, 11·51 cwt. of coke sold, 17·76 gallons of tar, and 29·66 lbs. of sulphate, per ton of coal carbonized.

The Convener and Manager were congratulated on the successful results of the year's working. It was agreed to reduce the price of gas 3½d. per 1000 c.ft., making the rate 3s. 2½d., which includes 7d. for Electricity Department losses. The rates for industrial consumers were fixed at 2s. 6d. to 1s. 10d. per 1000 c.ft., as per scale.

The Town Council, at a later meeting, in considering the salaries of officials, unanimously agreed to increase the salary of the Gas Engineer (Mr. J. W. Napier) by £150. This was the only increase of salary granted.

ALLIANCE AND DUBLIN CONSUMERS' GAS COMPANY.

Half-Yearly General Meeting.

The ordinary half-yearly general meeting of the Alliance and Dublin Consumers' Gas Company was held on Sept. 24. In the absence of the Chairman (Mr. Francis J. Dickens, J.P.), Mr. Joseph X. Murphy presided.

Chairman's Statement.

In the statement read by Mr. Murphy, on behalf of Mr. Dickens, it was declared to be a great disappointment to the Board that, after amicably adjusting all differences which arose with labour during the difficult and trying times experienced since the outbreak of war, ten years ago, it was found impossible to prevent a general strike of the bulk of the Company's employees in May last. Fortunately, the stoppage was not of long duration, as, after being compelled to discontinue the gas supply on May 14, it was resumed on June 2. At the same time, the Directors greatly regretted the loss and inconvenience sustained by the public generally, and, in thanking those numerous customers who sympathized with the Company or offered their assistance, they desired to assure them that no effort was spared, either by the Free State Government or the Company, to avoid the drastic step taken by the men. In view of what transpired, it was gratifying to find that the sales of gas were down by less than 3 p.ct. If no interruption in the supply had occurred, they would have been able to show an increase of more than 6 p.ct.

Customers and Services.

Turning to the accounts, the figures submitted for consideration were of a satisfactory nature, and he was glad to be able to congratulate them on the steadily maintained and increasing improvement in the affairs of the Company. It would interest them to know that during the half-year under review, they secured 1873 new consumers, while no less than 764 new services were laid. There were 796 new cookers and 305 heating stoves sent out, a large proportion of which were actually sold outright to consumers. The capital expenditure on this occasion, while not quite so heavy as in the corresponding period, amounted to a substantial figure, but the Board regarded this as a good sign, as it represented the costs involved in securing the expansion of business.

Revenue Account.

Proceeding to the revenue account, it was rather disappointing to find that the cost of the principal commodities—namely, coal and oil—had increased by no less than £8685, as compared with 1923, particularly when they found that the quantity of coal carbonized was almost identically at the same figure as that of the corresponding half-year. The explanation lay in the fact that coal had cost 4s. per ton more than during the same period last year. Fortunately, however, the increased expenditure was almost entirely off-set by the better prices obtained for coke and breeze, the receipts for which were higher by £8467. The income from tar was slightly less; and there was still a further falling-off under the heading of sulphate, owing to the higher figures paid for acid, and the lower selling prices ruling for this fertilizer.

Lower Income from Sales.

As management and miscellaneous charges remained about the same, he turned to the other side of the account. The net income from sales of gas was lower by no less than £45,239. Except for a slight fall in the total quantity of gas sold, this was entirely due to the substantial reduction in the price of gas which came into operation at the beginning of the year. To sum up, expenditure as well as income was down to the extent of £37,000, so that the revenue profit remained almost the same as on the corresponding occasion, which, in the circumstances, the Board considered not unsatisfactory; and they felt justified in recommending an increase in the dividend to 6½ p.ct., and the appropriation of the remainder of the net profit available to the credit of the reserve fund.

Balance-Sheet.

The balance-sheet again disclosed a satisfactory state of affairs. Funds showed an increase of over £31,000, while liabilities to tradesmen and others were down by £24,000. On the assets side, cash at bankers was considerably lower, but the value of investments was increased to a corresponding extent. Similar remarks applied to stocks and debtors, because the former figure was up, and the latter down, by approximately similar amounts. It only remained to say that there appeared to be every reason for confidence in the Company's prospects.

Mr. Murphy then moved the adoption of the report and statement of accounts.

The motion was seconded by Mr. Davies, and passed without comment.

On the motion of Mr. Murphy, seconded by Mr. Bond, a resolution was adopted for payment of a dividend at the rate of 6½ p.ct. per annum, less income-tax, on the consolidated ordinary stock of the Company, which will absorb the sum of £48,495, and the appropriation of the remainder, amounting to £6196, to the reserve fund.

TRURO GAS COMPANY.

At the annual meeting of the Company it was reported that the output of gas during the year constituted a record in the history of the undertaking. Owing to the indisposition of Mr. Joseph Rogers (the Chairman), Mr. W. Bryant presided.

The report stated that the consumption of gas showed a gratifying increase, and now exceeded 50 million c.ft. per annum. The offices and showrooms had been reconstructed and enlarged, and the most modern appliances for the use of gas might be inspected there under working conditions. The balance standing to the credit of the profit and loss account was £3470, and the Directors recommended a dividend of 5½ p.ct. on the ordinary stock, leaving a balance to be carried forward of £1755. Favourable contracts for coal having been made for the current year, the Directors proposed to reduce the price of gas by 1d. per therm (equal to 4½d. per 1000 c.ft.) as from Oct. 1, and to increase the discounts allowed for gas used for power purposes.

The Chairman, in moving the adoption of the report, said it was a satisfactory one, and augured well for the future. The output of gas now exceeded pre-war figures, and they had just written off the last amount on the suspense account for the vertical retorts.

Mr. S. J. Ingram (Managing-Director and Engineer), in seconding, said that during the long period he had been associated with the Company he had never come before the stockholders with more gratification as far as the year that had passed was concerned, and with more confidence as to the future, than he did that day. To have put on no less than 3½ million c.ft. to the sale of gas showed there must be more extensive use of it by the general public. They had secured on an average one additional consumer every week, and in addition they were fitting out one special appliance of some sort every working day of the year. Their new showrooms had been an abundant success, exceeding the liveliest anticipations. Notwithstanding the uncertain outlook as far as the future was concerned, the Directors had reduced the price of gas by 1d. per therm, and had extended the discounts on that used for power purposes. The price of gas for generating electrical energy was brought down to 1s. per therm. In other words, if electrical energy was required to any reasonable extent, consumers would be able to produce it at practically one-half of the cost at which the Corporation would be prepared to supply them.

The report was adopted, and the dividends recommended were declared.

The Chairman, proposing a vote of thanks to the staff, paid a tribute to their loyalty, efficiency, and co-operation, which was bound to produce good results.

Mr. W. H. Sainsbury (the Secretary), responding, said the staff worked together amicably, and all were interested in the prosperity of the Company.

Mr. Leslie P. Ingram (the Assistant Engineer) remarked that the reason they got on so well was because they had an efficient body of men who gladly co-operated with the officials in all their efforts.

A Main-Laying Mishap.—At the Harrogate County Court, on Friday last, His Honour Judge J. W. M'Carthy found for the plaintiff, with costs, in a claim by John Bennett Horsfall, of Sandringham Terrace, Wetherby, on behalf of his son, Ernest, aged 10, against the Tadcaster and Wetherby District Gas Light Company, for £10 4s. 3d. damages for alleged negligence. On May 6, the boy, while walking in North Street, Wetherby, where the Company were laying a gas main, stumbled against a pickaxe leaning against a wall, and in falling he received injuries to the knee, which necessitated attention at the Leeds Infirmary. It was stated that there was no barrier protection. The defence was that the Company closed the street in accordance with their powers, and took all reasonable precautions to prevent people using the footpath. There were barriers at either end of the street, and those using the street did so at their own risk.

BOROUGH OF COLNE GAS DEPARTMENT.

In his report for the twelve months ended March 31, Mr. Frederic Thorpe, the Engineer, states that the expenditure for the year was £43,623 and the income £58,357, leaving a gross profit of £14,734. Interest on investments and a credit from public lighting account, in all £80, bring the total to £14,815. Interest and sinking fund contributions called for £8640, leaving the net profit £6174. The coal carbonized amounted to 11,381 tons, and the average price per ton delivered into the works was 26s. 5d.—an increase of 9d. per ton over the previous year. The gas made per ton of coal averaged 20,967 c.ft. The quantity of gas manufactured was 238,626,000 c.ft.—an increase of 7,733,000 c.ft. compared with last year, equal to 3·34 p.ct. The net return from the sale of residuals was £9477.

In July, 1923, a new showroom was opened in Market Place, where apparatus for cooking, heating, and lighting by gas are displayed. During the nine months, the uses to which the room has been put have justified the course taken by the Committee. The total amount of sales for the period named came to £1567, representing 335 appliances.

TRADE NOTES.

Fuel Recovery.

Messrs. George Waller and Son, Ltd., have secured the order for the supply of a combined pan ash and coke breeze washing plant for the Longford Gas-Works of the Warrington Corporation Gas Department.

The New Welsbach Catalogue.

The new season's catalogue of the Welsbach Light Company, Ltd., Welsbach House, King's Cross, W.C. 1, has been prepared with this firm's customary good taste and thoroughness, and is indicative of the wide scope and excellent quality of their manufactures.

Messrs. James Gordon & Co., Ltd.

Messrs. James Gordon & Co., Ltd., of Windsor House, Kingsway, London, advise us that they have recently opened a branch office at No. 110, Waterloo Street, Glasgow, under the management of Mr. A. D. Burgess. The firm specialize in instruments and appliances for boilers.

A Work of Art.

No other phrase can be more appropriate regarding a remarkable catalogue issued by Giuseppe Verzocchi, in which are described pictorially the merits and applications of "V. & D." firebricks. In this catalogue the consumer is told, practically without words, all he needs and wishes to know about these firebricks.

British Gas Purifying Materials.

The British Gas Purifying Materials Company, Ltd., No. 99, London Road, Leicester, have issued a pamphlet in which are described the process of manufacture and excellent properties of their purifying material. This is a natural English bog ore mined from the Company's own deposits and enriched with natural English hydrated oxide of iron. No sawdust or other inert materials are used or required for lightening.

The "Hollar" Boiler.

The object of a booklet brought out by the Richmond Gas Stove and Meter Company, Ltd., of Warrington, is to introduce the "Hollar" boiler to gas heating and plumbing engineers. Carefully compiled, it places at their command as varied and complete information and assistance as possible. A study of its pages will convince all who are interested in water heating that the "Hollar" boiler ensures high efficiency with low cost. A booklet of the same type, but dealing with geysers, has also been published by the firm.

The Sharples Super-Centrifuge.

The latest catalogue of Messrs. Super-Centrifugal Engineers, Ltd., Imperial House, Kingsway, W.C. 2, is a very well prepared little book, and describes briefly a few of the many processes to which the Sharples super-centrifuge has been applied in industry. The apparatus has been applied with success to the dehydration of water gas tar. The tar is fed direct to the super-centrifuge, which operates at from 100 to 400 gallons per hour, the capacity depending on the nature of the emulsion and the requirements of the finished product. There is no accumulation of emulsion, and the tar is run direct to storage.

Gas Exhibition at Accrington.—An exhibition of gas appliances, combined with practical cookery demonstrations, was opened in the Wesley School, Abbey Street, Accrington, on Sept. 22, under the auspices of the Accrington and District Gas Board. The object of the exhibition was to demonstrate the adaptability of gas to practically every requirement of life and industry. In a booklet describing the exhibition, prepared by Mr. A. J. Harrison (the Manager), it is claimed that "the application of gas to an enormous and increasing number of widely varied industrial operations has greatly facilitated economic production, while conserving in a very considerable measure the national resources of raw coal and labour." Alderman D. C. Dewhurst, J.P. (Chairman of the Board), performed the opening ceremony, and congratulated the General Manager and his staff on the excellent use they had made of the space allotted to them. It was essential that the public should be made aware of the uses to which gas could be put; and he hoped that the exhibition would be the means of prospering the gas industry. The exhibits displayed included those of Messrs. Henry Slack and Sons, Grange Works, Accrington; Cannon Iron Foundries, Ltd., of Bilston; Messrs. R. & A. Main, of Falkirk; Messrs. Wilsons and Mathieson, of Leeds; Messrs. John Wright & Co., of Birmingham; Radiation Limited, of London; Messrs. Falk, Stadelmann, & Co., of Manchester; and the British Commercial Gas Association.

NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

There is again no special feature to record in this market. Trade is no better, and prospects are no better. On the other hand, prices obtained for the meagre business offering are no lower; it being generally agreed that collieries must work short time rather than take less. The position is, of course, steadily growing worse as higher-priced contracts run out; these, while they last, enabling producers to accept business which in itself shows considerable losses. Reports are to the effect that notices are now in for several more pits to close down entirely. There are said to be already 13,000 unemployed on the books of the Durham Miners' Association, with prospects of an early addition of 5000 to this number. Most others are only working short time.

Prospects for next year are still not opening out, and the demand for all positions is as slack as ever. Best gas qualities, though still the firmest section in the market, are finding it difficult to maintain their prices in face of the plentiful supplies of seconds and others offering at prices down to 17s. Wear Specials, however, still quote 22s. 6d., and best qualities 21s. to 22s., though there is always a possibility of discounting these for prompt shipment if it suits colliery positions.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

The gas coal trade in Yorkshire and Lancashire is quiet outside contract. House coals are in good demand, and collieries report that no stocks are available. Industrial fuel is on the decline, and will probably continue so to the end of the year. For shipment there are not many inquiries. Prices at Hull at the week-end were nominal, as follows: Bunkers—Yorkshire, Derby, and Notts large screened steam, f.o.b. Humber ports, 19s. to 21s. per ton. Cargo for export, f.o.b., usual shipping ports. Best Yorks hards, Association, 23s. 6d. to 23s. 9d.; Derby best hards, 24s. 6d. to 25s.; West Yorks Hartleys, 21s. to 24s. 6d.; South Yorks washed doubles, 19s.; South Yorks washed singles, 18s. to 18s. 6d.; dry doubles, 17s. to 17s. 9d.; South Yorks washed smalls, 16s.; Derby slack, 1 in., 12s. 6d. to 13s.; South Yorks rough slack, 14s.; gas coke, 35s.; foundry furnace coke, 25s.; washed smithy peas, 21s. 6d. to 26s.; washed steam thirds, 19s. 6d.; South Yorks washed trebles, 23s. 6d. per ton.

COAL TRADE IN THE MIDLANDS.

From our Local Correspondent.

Stocking accommodation having been filled up, gas undertakings are not able to accept delivery of coal as fast as it is being raised, for there is not very much indication of the hoped-for expansion of industrial consumption. In these circumstances spot lots of gas coal are being offered at very low prices.

Steam coals are moving off only slowly. There is no material change in values on the week; but the sluggishness of the market depreciates smalls, which are in much larger supply than the trade can absorb. In the Birmingham area most of the collieries continue in regular working on orders for household coal. Demand runs so much upon the better grades that the position is becoming more unbalanced.

Cokeries have taken a bold step in an effort to re-animate the pig-iron industry in the Midlands. After long negotiation the basis price under the new scale has been reduced from 20s. 6d. at ovens to 16s. 9d. Collieries say the economic position does not justify the cut except on the principle of making a present sacrifice for an ultimate gain. They realize that, though pig iron is being sold at a loss, the cost is too high to enable the ironmasters to get on terms with outside competition. A larger turnover is a chief desideratum in bringing down production costs, and this cut of 3s. 9d. in coke is made in the hope that it will stimulate demand. The arrangement, which applies only to blast-furnaces within the Association, is to run for three months.

Reduced Price for Falkirk Gas.

The price of gas to all classes of consumer in Falkirk is to be reduced by 1·7d. per therm, equal to 7·31d. per 1000 c.ft. This reduction, which was intimated at a special meeting of the Town Council, follows upon a reduction made last year of 8d. per 1000 c.ft., while in the previous year there was a reduction of 1s. per 1000 c.ft. In the three years £44,700 of the expenditure of £65,661 involved in the erection of new vertical retorts at the gas-works has been paid off, while the estimates allow for £4000 being put towards the balance of the debt next year, as well as £6042 to be made available for the still further reduction of the price of gas to consumers. The present rate of 3s. 5¾d. per 1000 c.ft. is only about 20 p.ct. over the pre-war rate of 2s. 11d. per 1000 c.ft. Bailie Gilchrist said that these excellent results were due to the good management of the works, and the installation of vertical retorts.

Belfast Gas Supply.—At a meeting of the Belfast Corporation Gas Committee, application was made by residents in the Dundonald district for an extension of the gas supply in that area; but the Committee, being advised that the consumption would not warrant the expenditure involved, decided to take no action for the present.

Baltimore Gas Capital.—An extraordinary meeting of the Consolidated Gas, Electric Light, and Power Company of Baltimore has been called to consider a proposal to amend the charter so as to change the number of shares of common stock by increasing to four times the present number the shares authorized, issued, and outstanding, and to provide that all these shares shall be of no par value, instead of the par value of $100 each, and to empower the Directors to authorize the issue from time to time of shares of common stock of no par value and securities convertible into shares of common stock of no par value for such considerations as may be deemed advisable.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *Sept.* 29.

The market for pitch continues quiet, and little business is reported. The price is nominal at 56s. to 57s. per ton. Creosote is a shade firmer at about 6¼d. to 6⅜d. net per gallon in bulk. Pure benzole is about 1s. 6d. per gallon, pure toluole about 1s. 8d. per gallon, and 95-160 solvent naphtha 1s. 5d. to 1s. 6d. per gallon. Other products are without alteration.

Tar Products in the Provinces.

Sept. 29.

The market for tar products has remained very dull indeed. There is little or no demand for pitch. A fair amount of business has been done at 42s. 6d. f.o.b. Creosote is quiet but fairly steady at existing prices. Other products remain unaltered, with little or no demand.

The average values for gas-works products during last week were: Gas-works coal tar, 27s. 6d. to 32s. 6d. Pitch, East Coast, 40s. to 42s. 6d. f.o.b. West Coast—Manchester, 35s. to 37s. 6d.; Liverpool, 36s. to 38s. 6d.; Clyde, 37s. 6d. to 40s. Benzole 90 p.ct., North, 1s. 2d. to 1s. 3d.; crude 65 p.ct. at 120° C., 9d. to 10d. naked at makers' works; 50-90 p.ct., naked, North, 1s. 2d. to 1s. 3d. Toluole, naked, North, 1s. 2d. to 1s. 3d., nominal. Coal tar crude naphtha in bulk, North, 7d. to 7¼d. Solvent naphtha, naked, North, 1s. to 1s. 1d. Heavy naphtha, North, 1s. to 1s. 1d. Creosote, in bulk, North, liquid, 5d. to 5¼d.; salty, 4⅞d. to 5d.; Scotland, 5d. to 5⅛d. Heavy oils, in bulk, North, 7d. to 7¼d. Carbolic acid, 60 p.ct, 1s. 7½d. to 1s. 8½d. prompt. Naphthalene, £13 to £15; salts, £5 to £7, bags included. Anthracene, "A" quality, 4d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

Imperial Continental Gas Association Distributions.

The Directors of the Imperial Continental Gas Association intend shortly to declare, out of the ascertained profits of the half-year ended June 30, 1924, an interim dividend at the rate of 5 p.ct. (actual) on the £1,976,000 capital stock of the Association, payable, less income-tax at 4s. 6d. in the pound—*i.e.*, the rate for the year 1924—on Nov. 15. In addition to the special dividend at the rate of 19½ p.ct. (net), which, as already announced, the Board intend to recommend the proprietors to declare out of the German compromise moneys at the general meeting in May next, they will further propose the declaration at that meeting of a bonus dividend at the rate of 5 p.ct. (actual), less income-tax, in celebration of the Association's centenary. This bonus dividend will be additional to the ordinary dividend, the final rate of which will be determined by the results of the year.

A Step Backward.—The Gorey (Co. Wexford) Town Commissioners propose to introduce petrol pressure lamps for street lighting in place of using coal gas.

Chinley Lighting.—The Chinley Council have decided to increase the lighting of the parish during the winter months; and several additional lamps will be lighted. A lighting rate of 3d. in the pound has been fixed.

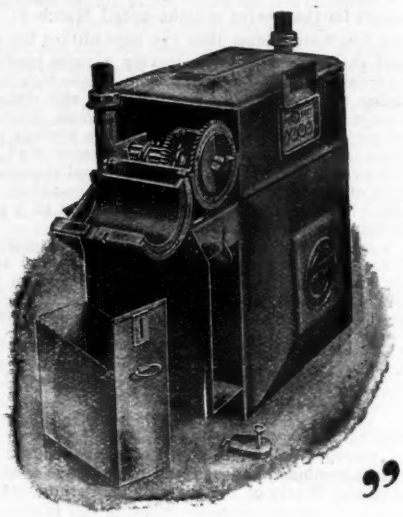
Limerick Gas Supply.—The Limerick Corporation decided to defer the question of applying to the Free State Ministry of Trade and Commerce for power to borrow £30,000 for the installation and erection of a new carbonizing plant at the city gas-works, pending the preparation by the Gas Committee of a pension scheme for the gas workers.

Increased Gas Sales at Morecambe.—At a meeting of the Morecambe Town Council on Sept. 23, Mr. Wilson, Chairman of the Gas Committee, reported that the income of the Gas Department for the past year was £44,807, and the expenditure on revenue account £27,213, leaving a gross profit of £17,593, and a net surplus of £2749. The gas sold to private consumers showed an increase of 8,473,800 c.ft. on the quantity for the previous year.

Matlock Bath Gas-Works.—The whole of the retiring members of the Matlock Bath District Council, prior to joining up with Matlock under the amalgamation scheme, have issued a proclamation to the ratepayers. In this they state that the Matlock Bath Gas-Works were acquired in 1896, at a cost of £26,500, and the debit remaining is £18,341, *less* £2360 standing to the credit of the undertaking. They point out that under amalgamation the works are to be run solely for the benefit of Matlock Bath, and not for the united area.

Proposed Gas and Electricity Test in Derbyshire.—The Wirksworth Urban Council have considered a letter from the Wirksworth Gas Company fixing the price of gas for street lighting purposes at 6s. 8d. per 1000 c.ft. The question of examining the costs and efficiency of gas and electricity in connection with street lighting was discussed; and it was suggested that one or two lamps in the most prominent parts of the town should be supplied with electricity. The terms of the Gas Company were accepted, and the question of making a test of gas and electricity was referred to the Lighting Committee.

Lewes Gas Company.—The half-yearly meeting of the Company was held last week under the chairmanship of Mr. Edward Monk. The Chairman, in moving the adoption of the report, said that the revenue account showed a profit of £1863. After providing for income-tax and interest on mortgages, &c., the balance of net revenue was £2526. The Directors recommended that dividends for the past half-year be declared at the rate of 5 p.ct. on the original capital stock, and at £3 10s. p.ct. on the additional capital stock. These dividends (after deduction of income-tax) would amount to £1150. The Chairman observed that there was little variation from the condition of affairs in the corresponding half of last year. The Company had made up considerable leeway in regard to repairs and renewals to stoves, fires, and cookers; and a more even quality of coal had enabled them not only to improve the supply of gas, but to gain greater advantage from residuals, particularly in regard to tar, the market for which was greatly improved.



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STOCK MARKET REPORT.

BUSINESS on the Stock Exchange last week, particularly towards the close, was well maintained, and in some sections a certain "liveliness" was apparent, notably in Tea and Oil shares. Gilt-edged securities remained firm. The 5 p.ct. War Loan closed $\frac{1}{16}$ up on the week at 102$\frac{1}{2}$, Funding "Fours" closed at 89 *ex* div., and Conversion 3$\frac{1}{2}$ p ct. fell slightly to 77$\frac{11}{16}$. Heavy buying was reported of the last issued New South Wales 5 p.ct. loan. The details of the forthcoming German loan continue to be the subject of much speculation.

In the Industrial and Miscellaneous markets, there has been a revival of interest in most sections. Dunlops' amended reconstruction scheme has now been passed, and the price hardened in consequence. Courtaulds and British Celanese were in good demand. The Iron and Steel section was fairly well supported. Tea shares were very prominent, and, after a slight set-back in the middle of the week on profit taking, closed with a strong tone. In the Oil Market, Mexican Eagles were the centre of considerable activity, together with Shells and Royal Dutch.

In the Gas Market prices were firm. Gas Light ordinary further improved, and closed 1$\frac{1}{2}$ points up on the week at 94-96. Both the Commercial ordinary stocks rose 2 points to 91-94, and the Imperial Continental 3 points to 169-174.

In the last three reports attention has been drawn to the yields on the ordinary stocks of various English gas companies. Attention is now turned to the principal companies operating abroad. Compared with English companies these have no restrictions as to dividends, and the yields are higher in the majority of cases. As an investment, therefore, they are more of a speculative nature.

The yield per cent. per annum at present prices on the ordinary stock or shares of those companies with capital of over £1,000,000 varies from £11 13s. 3d. in the case of the Imperial Continental to £5 for the European. The former includes a special distribution on account of claims paid by the German Government, a further instalment of which is booked for next year. The yields per cent. per annum at present prices of those companies with capital under £1,000,000 range from £10 in the case of the Cape Town Company down to £6 5s. in respect of the Hong Kong Company. The South African £10 shares yield £8 15s., Malta and Mediterranean £5 shares £8 5s. 6d., Oriental stock £7 19s. 2d., Bombay £5 shares £7 12s. 4d., and Montevideo stock £7 1s. 7d. The Continental Union Company, whose assets consist chiefly of investments in gas undertakings, have paid no dividend on their ordinary stock since 1915; but on rumours of a possible bonus distribution the stock has risen 13 points in the last month.

The following transactions were recorded during the week:

On Monday, Alliance and Dublin 65, 67$\frac{1}{2}$, Brentford "A" 112$\frac{1}{2}$, "B" 113, 6 p.ct. Richmond debenture 102, Commercial 4 p.ct. 92, Continental 42, 42$\frac{1}{4}$, 7 p.ct. preference 90, Gas Light and Coke 94, 94$\frac{1}{8}$, 94$\frac{1}{2}$, 94$\frac{5}{8}$, 94$\frac{3}{4}$, 95, 95$\frac{1}{8}$, 3$\frac{1}{2}$ p.ct. maximum 62$\frac{3}{4}$, 63$\frac{1}{4}$, 4 p.ct. preference 78$\frac{1}{4}$, 79$\frac{3}{4}$, 80$\frac{1}{4}$, Hastings and St. Leonards 3$\frac{1}{2}$ p.ct. 78$\frac{1}{2}$ *ex* div., Imperial Continental 170$\frac{1}{2}$, 172, Primitiva 7s. 4$\frac{1}{2}$d., South Metropolitan 99, 99$\frac{1}{4}$, 100, South Suburban 5 p.ct. 103. Supplementary prices, Brentford 7$\frac{1}{2}$ p.ct. mortgages 103, Croydon 6 p.ct. debenture 101, 102, Gas Light and Coke 10 p.ct. bonds 190$\frac{3}{4}$, 191$\frac{1}{4}$, Lea Bridge 7$\frac{1}{2}$ p.ct. debenture 105$\frac{1}{2}$.

On Tuesday, Alliance and Dublin 66$\frac{1}{4}$, Brentford "B" 112, 6 p.ct. Richmond debenture 102$\frac{3}{4}$, Commercial 4 p.ct. 93, European 8$\frac{1}{16}$, 8$\frac{1}{8}$, Gas Light and Coke 94$\frac{1}{8}$, 94$\frac{3}{4}$, 95, 95$\frac{1}{8}$, 95$\frac{3}{8}$, 95$\frac{1}{4}$, 95$\frac{3}{8}$, 96, 3$\frac{1}{2}$ p.ct. maximum 63$\frac{1}{4}$, 4 p.ct. preference 79$\frac{3}{4}$, 79$\frac{7}{8}$, 3 p.ct. debenture 61$\frac{1}{2}$, Imperial Continental 170$\frac{1}{2}$, 171, 171$\frac{1}{2}$, 172, South Metropolitan 99, 99$\frac{3}{8}$, 99$\frac{3}{4}$, 99$\frac{7}{8}$, Wandsworth "A" 138, 138$\frac{1}{2}$. Supplementary prices, Watford 3$\frac{1}{2}$ p.ct. "B" 95$\frac{3}{4}$, 96$\frac{1}{4}$.

On Wednesday, Alliance and Dublin 66, 4 p.ct. debenture 65$\frac{3}{4}$, 67, Brentford "A" 112, "B" 112, Commercial 4 p.ct. 92, Continental Union 40, 40$\frac{1}{2}$, Croydon sliding-scale 102, 103, maximum dividend 86, 86$\frac{1}{4}$, European 8, Gas Light and Coke 95, 95$\frac{1}{4}$, 95$\frac{3}{8}$, 95$\frac{1}{2}$, 95$\frac{5}{8}$, 95$\frac{7}{8}$, 4 p.ct. preference 78$\frac{1}{4}$, 80, 3 p.ct. debenture 60$\frac{1}{2}$, Imperial Continental 171, Oriental 100$\frac{3}{8}$, South African 7$\frac{1}{4}$, South Metropolitan 99$\frac{3}{8}$, 99$\frac{7}{16}$, 99$\frac{1}{2}$, 99$\frac{5}{8}$. Supplementary prices, Brentford 7$\frac{1}{2}$ p.ct. mortgages, 103, 105, Danish 5 p.ct. preference 5$\frac{1}{2}$, 5$\frac{13}{16}$, South Suburban 7 p.ct. debenture 103$\frac{3}{4}$.

On Thursday, Brentford "A" 112$\frac{5}{16}$, "B" 112$\frac{5}{16}$, Commercial 4 p.ct. 91, 93$\frac{1}{2}$, 3$\frac{1}{2}$ p.ct. 91, 92$\frac{1}{2}$, Continental Union 39, 40, 41, European 8, Gas Light and Coke 95$\frac{1}{4}$, 95$\frac{1}{2}$, 4 p.ct. preference 79, Imperial Continental 171$\frac{1}{2}$, 172, 173, Primitiva 7s., 7s. 4$\frac{1}{2}$d. Supplementary prices, South Suburban 7 p.ct. debenture 104$\frac{7}{8}$.

On Friday, Bombay 5$\frac{5}{16}$, Brentford "A" 112$\frac{3}{8}$, Cape Town and District 7$\frac{1}{2}$, European 8, Gas Light and Coke 95$\frac{1}{4}$, 95$\frac{3}{8}$, 95$\frac{1}{2}$, 95$\frac{5}{8}$, 95$\frac{3}{4}$, 3$\frac{1}{2}$ p.ct. maximum 64, 4 p.ct. preference 80, Imperial Continental 174, Primitiva 7s. 3d., 7s. 6d., South Metropolitan 98$\frac{3}{4}$, 99, 99$\frac{1}{4}$, 99$\frac{1}{2}$, 99$\frac{5}{8}$, South Suburban 5 p.ct. 103. Supplementary prices, Wandsworth 3$\frac{1}{2}$ p.ct. New 100, 100$\frac{1}{2}$.

In Lombard Street, money was plentiful, and discount quotations were a little easier. Treasury Bills were issued on Friday at the slightly lower rate of £3 12s. 4·7d. p.ct., compared with £3 13s. 1·09d. p.ct. the previous week.

The Foreign Exchanges closed with a firm tone. Sterling on New York was a trifle higher at 4.47$\frac{7}{16}$. French francs closed at 84 82$\frac{1}{2}$. Belgian francs, for which there was a good demand, finished level at 92.

The Bank rate remains unchanged at 4 p.ct.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Sept. 26.	Rise + or Fall − on Week.	Transactions Lowest and Highest Prices.
£			%p.a.	%p.a.				
171,978	Stk.	Aug. 14	5	5	Aldershot 5 p.c. max. C.	80—83	..	..
235,492	,,	,,	4	4	Do. 4 p.c. Pref.	68—72	..	..
1,351,868	,,	Sept. 25	6	6½	Alliance & Dublin Ord.	61—66*	−2	65—67½
374,000	,,	July 10	4	4	Do. 4 p.c. Deb.	63—68	..	65½—67
300,000	5	May 22	8	8	Bombay, Ltd.	5—5½	..	..
100,000	10	Aug. 14	8½	8½	Bournemouth 5 p.c.	12½—13½	..	..
383,110	10	,,	7	7	Do. B 7 p.c..	11½—12½	..	..
150,000	10	,,	6	6	Do. Pref. 6 p.c..	10½—11½	..	..
50,000	Stk.	June 26	3	3	Do. 3 p.c. Deb..	54—59	..	..
162,023	,,	,,	4	4	Do. 4 p.c. Deb..	74—79	..	..
992,045	,,	July 10	6$\frac{1}{10}$	6$\frac{1}{10}$	Brentford A Con.	110—115	..	112—112½
990,500	,,	,,	6$\frac{2}{5}$	6$\frac{2}{5}$	Do. B New	110—115	..	112—113
76,000	,,	,,	5	5	Do. 5 p.c. Pref.	87—92	..	..
306,690	,,	June 12	4	4	Do. 4 p.c. Deb.	75—80	..	..
181,337	,,	,,	—	6	Do. 6 p.c. Rich. Red. Deb.	100—105	..	102—102½
214,740	,,	Aug. 28	11½	11½	Brighton & Hove Orig.	167—172	..	..
244,200	,,	,,	8½	8½	Do. A Ord.	123—126	..	..
1,287,500	,,	July 24	5	5	Bristol 5 p.c. max..	91—92*a	..	..
855,000	,,	Sept. 25	7	8	British Ord.	115—120*	−2	..
100,000	,,	June 26	7	7	Do. 7 p.c. Pref..	118—123	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	72—77	..	..
100,000	10	May 22	6	8	Cape Town, Ltd.	6½—7½	..	7½
100,000	10	Apr. 24	4½	4½	Do. 4½ p.c. Pref..	6—7	..	..
150,000	Stk.	June 26	4½	4½	Do. 4½ p.c. Deb..	71—76	..	..
626,860	,,	July 24	6	6	Cardiff Con. Ord.	97—100	..	..
237,860	,,	June 26	7½	7½	Do. 7½ p.c. Red. Deb.	103—106	..	..
137,130	,,	Aug. 14	6½	5	Chester 5 p.c. Ord.	86—91*b	..	..
1,513,280	,,	July 24	6	6	Commercial 4 p.c. Cap.	91—94	+2	91—93½
560,000	,,	,,	6	6	Do. 3½ p.c. Cap.	91—94	+2	91—92½
475,000	,,	June 12	3	3	Do. 3 p.c. Deb.	56—59	..	..
800,000	,,	14 Jan. 15	—	—	Continental Union, Ltd.	40—45	..	39—42½
200,000	,,	June 12	7	7	Do. 7 p.c. Pref.	87—92	..	90
660,000	,,	Aug. 28	6½	6½	Croydon sliding scale	100—103	+1	102—103
284,975	,,	,,	5	5	Do. max. div.	84—87	+1½	86—86½
492,270	,,	Aug. 28	9	6	Derby Con.	107—110	..	..
55,000	,,	July 10	4	4	Do. Deb.	74—76*c	..	..
209,000	,,	Apr. 3	5	5	East Hull 5 p.c. max.	..	..	..
1,002,180	10	July 24	2	6	European, Ltd.	7½—8½	..	8—8½
16,503,045	Stk.	Aug. 14	5½	5½	Gas Light & Coke 4 p.c. Ord.	94—96	+1½	94—96
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	61—64	..	62½—64
4,062,235	,,	,,	4	4	Do. 4 p.c. Con. Pref.	78—81	..	78½—80½
4,761,930	,,	June 12	3	3	Do. 3 p.c. Con. Deb.	60—63	..	60½—61½
130,000	,,	—	10	10	Do. 10 p.c. Bonds	..	..	190½—191½
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Sept. 11	6½	6½	Hastings & St. L. 5 p.c. Conv.	95—100	..	..
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	75—80	..	78½
70,000	10	Sept. 25	10	10	Hongkong & China, Ltd.	15½—16½*	−½	..
86,600	Stk.	Aug. 14	10	10	Hornsey 7 p.c.	138—143	..	..
1,976,000	,,	May 22	10	30	Imperial Continental Cap..	169—174	+3	170½—174
263,950	,,	Aug. 14	3½	3½	Do. 3½ p.c. Red. Deb.	68—71	..	..
235,242	,,	Aug. 14	6½	6½	Lea Bridge 5 p.c. Ord..	91—100	..	..
2,127,340	,,	Aug. 14	5½	5½	Liverpool 5 p.c. Ord.	88½—89½*b	..	..
600,000	,,	Sept. 25	7	7	Do. 7 p.c. Red. Pref.	102—105*b	−3	..
165,736	,,	Aug. 28	8	9	Maidstone 5 p.c. Cap.	120—125	..	..
63,480	,,	June 26	3	3	Do. 3 p.c. Deb..	53—58	..	..
75,000	5	,,	5	7	Malta & Mediterranean	3½—3¾	..	..
541,920	Stk.	June 12	4	4	Montevideo, Ltd.	54—59	..	..
1,575,892	,,	July 24	5½	5	Newcastle & Gateshead Con.	81—82*d*	..	..
250,166	,,	,,	4	4	Do. 4 p.c. Pref..	74—75*d*	..	..
529,705	,,	June 26	3½	3½	Do. 3½ p.c. Deb.	70—72*d*	..	..
15,000	10	Aug. 28	11	11	North Middlesex 10 p.c.	15½—16½	..	..
75,940	10	,,	7$\frac{7}{10}$	7$\frac{7}{10}$	Do. 7 p.c.	11—11½	..	..
300,000	Stk.	May 8	9	7	Oriental, Ltd.	99—102	+1	100½
138,120	,,	June 26	7$\frac{7}{8}$	7½	Plym'th & Ston'house 5 p.c.	112—117	..	..
60,000	50	Aug. 28	13	13	Portsea Island B	99—102	..	..
100,000	50	,,	12	12	Do. C	95—100	..	..
2,289,909	1	—	—	—	Primitiva Ord.	6/9—7/9	−·/3	7/·—7/6
341,400	100	June 2	4	4	Do. 4 p.c. Red. Deb..	76—79	..	..
600,000	Stk.	July 24	4	4	Do. 4 p.c. Red. Deb. 1911	53—56	..	..
220,335	,,	June 26	4	4	Do. B. Aires 4 p.c. Rd. Db.	54—57	..	..
321,670	,,	,,	4	4	Do. R'r P'te 4 p.c. Rd. Db.	54—57	..	..
150,000	10	Sept. 25	6	6	San Paulo 6 p.c. Pref.	6½—7½*	−½	..
125,000	50	July 1	5	5	Do. 5 p.c. Red. Deb.	41—43	..	..
270,000	Stk.	Aug. 28	5/8/4	5½	Sheffield A	100—102*e*	..	..
419,968	,,	,,	5/8/4	3½	Do. B	100—102*e*	..	..
1,047,000	,,	,,	5/8/4	3½	Do. C	100—102*e*	..	..
90,000	10	June 12	6	8	South African	7—9	..	7½
6,609,895	Stk.	Aug. 14	6½	5	South Met. Ord.	98½—100½	..	98½—100
102,580	,,	July 10	5	5	Do. Red Pref.	96—98	..	..
1,895,445	,,	,,	3	3	Do. 3 p.c. Deb.	59—62	..	..
734,000	,,	Sept. 11	6½	6½	Do. 6½ p.c. Red. Deb.	101—103	..	..
91,500	,,	Aug. 28	8½	8½	South Shields Con.	134—136*d*	+1	..
1,087,795	,,	Aug. 14	6½	6½	South Suburban Ord. 5 p.c.	102—105	..	103
368,837	,,	June 26	5	5	Do. 5 p.c. Deb.	93—98	..	..
647,740	,,	May 8	5	5	South'mpt'n Ord. 5 p.c. max.	85—88	..	..
121,275	,,	June 26	4	4	Do. 4 p.c. Deb.	72—78	..	..
250,000	,,	Aug. 28	7	7	Swansea 7 p.c. Red. Pref.	101½—103½	..	..
200,000	,,	June 26	6½	6½	Do. 6½ p.c. Red. Deb.	102—104	..	..
120,000	,,	July 24	8	8	Tottenham District A 5 p.c.	116—119	..	..
882,275	,,	,,	6½	6½	Do. B 3½ p.c.	99—102	..	..
181,255	,,	June 12	4	4	Do. 4 p.c. Deb.	76—80	..	..
258,251	,,	Aug. 28	7/14/4	5	Tynemouth Con. and New	84—86*d*	..	..
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	July 10	9½	9½	Wandsworth A 5 p.c.	135—140	..	138—138½
255,636	,,	,,	7½	7½	Do. B 3½ p.c.	113—118	..	..
108,075	,,	,,	6/7/9	6/9/6	Do. C	96—101	..	..
240,865	,,	,,	6/7/9	6/9/6	New Ordinary	..	..	100—100½
352,000	,,	,,	7½	7½	Wimbledon 5 p.ct.	110—115	..	..
98,000	,,	,,	7½	7½	Epsom 5 p.ct.	115—120	..	..
88,426	,,	June 26	3	3	3 p.c. Deb.	55—60	..	..

Quotations at:—*a*.—Bristol. *b*.—Liverpool. *c*.—Nottingham. *d*.—Newcastle. *e*.—Sheffield. * Ex. div.

Gas in Pennsylvania.—In the manufactured gas industry in Pennsylvania the capital invested amounted to $57,510,201 last year, while in 1922 it was $56,336,596. Consumers used 26,624,104,000 c.ft. of gas, including 3 981,195,000 c.ft. of bye-product coke oven gas. The number of consumers last year was 766,930, and the average price of gas was $1.15 per 1000 c.ft. for commercial consumers; $1.09 for industrial and manufacturing; $1.05 for public users; and 95 c. for others.

In consequence of a gale, the Burnley Corporation Gas Department had 300 street lamps damaged.

The price of gas in Londonderry City has been reduced by 6d. per 1000 c.ft., which equals 1d. per therm.

The gas appliance exhibition and cookery lectures arranged by the Accrington and District Gas and Water Board have been a great success; many orders having been booked.

The Middlesbrough Corporation Gas Committee have decided to let out on hire in a purely working-class ward a hundred gas-boilers at a cost of 6d. a week. If the experiment is successful, it is to be extended to other parts of the town.

Considerable damage to the rear of a two-storied factory owned by Messrs. Edward Page, gasfittings manufacturers, Clifford Street, Lozells, Birmingham, was caused by fire last Saturday week. The origin of the outbreak is at present unknown.

The Accrington and District Gas and Water Board have now purchased the undertaking of the Whalley Gas Lighting Company, and gas is now being supplied to the residents under the changed conditions. The purchase was completed to-day.

A meeting of Cookstown (co. Tyrone) gas consumers considered the proposed introduction of electric lighting in the town, and appointed a Committee to confer with two companies concerned, and also with the Northern Ireland Government Electricity Committee.

A sad fatality at the Burnley Gas-Works is a direct result of last week-end's storm. A portion of the roof of the tar distillery had been damaged by the gale, and a Corporation slater, Arthur Barras, while repairing the roof, fell a distance of 40 ft. owing to about 4 ft. of the roof collapsing. His injuries terminated fatally.

At a Dewsbury inquest, last week, on Elsie Goodall, the 3-year old daughter of a railway shunter, who died in the Infirmary from shock, following burns, it was stated that the child's nightdress caught fire from a gas-ring which was under the kitchen table. The parents said they judged the place to be the safest in the kitchen, because there was less likelihood of pans being pulled over. The Coroner, while admitting the difficulties of the parents, said he could not agree that this was the safest place. He condemned the wearing of flannelette clothing by young children. The verdict was "Accidental death."

The Hasland Council have arranged terms with the Chesterfield Gas Company for the supply of gas during the winter months; and all the lamps are to be lighted.

Escaping gas became ignited last Thursday at the corner of Garbutt Street and Norton Road, Stockton, where excavations had been made and a new main was being installed. The gas took fire while a workman was making a joint in the pipe. For about an hour all traffic was held up, but eventually the flames were subdued by a liberal application of sand.

Mr. J. H. Clegg, Burnley Corporation Gas Engineer, has recently secured a good advertisement for gas by inducing about a dozen of the tradesmen in a main thoroughfare to have lamps of 1000 c.p. installed outside their premises. The brilliant illumination, besides making a great contrast, is attracting people, and the tradesmen should profit for their enterprise.

The Leeds Gas Committee, last week, decided to recommend the borrowing of a further £50,000 to carry on the purchase of meters, stoves, &c., to cope with the demands for all phases of gas supply, in respect of which power to borrow an initial £50,000 was given some little time ago. At present there are about 14,000 orders for service and supply in hand, which are being dealt with at the rate of 1400 per week.

At the invitation of Mr. Walter T. Dunn (Secretary of the Institution of Gas Engineers), Mr. W. J. Liberty gave an illustrated lecture, entitled "Lights Ancient and Modern," at the Streatham Hill Congregational Church, on Wednesday, the 24th ult., in aid of the funds of the school. Alderman George Harvey, J.P., L.C.C., Mayor of the Metropolitan Borough of Holborn, presided. A large and appreciative audience was present.

The London Office staff of Vickers and International Combustion Engineering, Ltd., had their first annual dinner at the Connaught Rooms on Sept. 23. Mr. Geo. C. Usher (the General Manager) was in the chair, and was supported by Mr. G. R. T. Taylor (Managing-Director). Though the Company only started operations in Great Britain in January last, the staff of the London Office already numbers 65, and in addition there is an extensive personnel at the works at Barrow-in-Furness.

At the inquest at Stockton-on-Tees, on Sept. 22, on Robert Williams, fitter and turner, of Thornaby Place, Thornaby, who was the victim of an explosion at the Quayside Engineering Works the previous Thursday, it was stated that deceased was working near an oxygen-acetylene generating plant used for cutting steel bars. He had helped to re-charge the plant, and prior to resuming work the gas had been turned on, but before it was lighted there was a loud explosion. Williams died from injuries and shock. The Coroner observed that, after what he had heard, he would not like to work acetylene. How precautions were to be taken was a subject upon which he was not qualified to express an opinion. "Accidental death" was the verdict.

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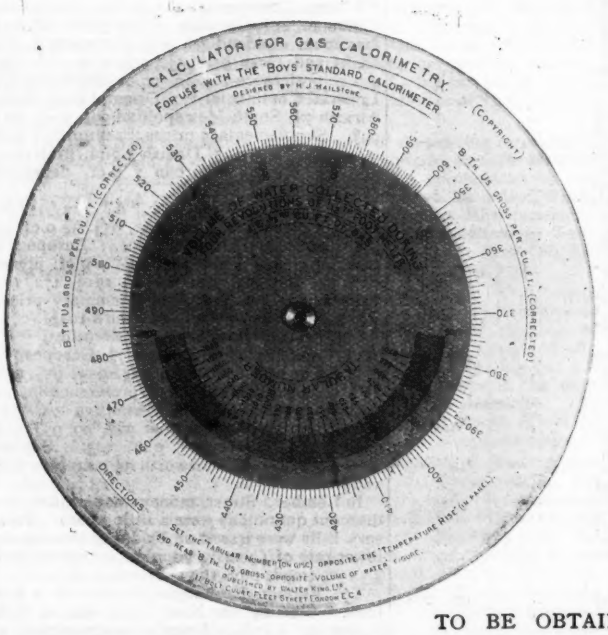
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(See Article in "JOURNAL," May 21, p. 523.)

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